Special net management pullout section: Page 17.

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES
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ICA ANNUAL CONVENTION

Spotlight on users at ICA

Innovation, applications shine in user-led sessions.

BY BOB WALLACE
Senior Editor

NEW ORLEANS — Hoping to benefit from the experiences of their peers, users flocked to the 40th International Communications Association (ICA) conference and exposition here last week to discuss issues as diverse as automated network trouble tracking and the future of WATS.

Telecommunications managers from ICA member corporations spoke of the triumphs and tribulations encountered in the day-to-day operation of their companies' communications networks. For its part, ICA saluted innovative users during a special session at the show. (See "Users group salutes innovative firms," page 4.) Communications professionals attended user-led minitutorials, workshops and discus-

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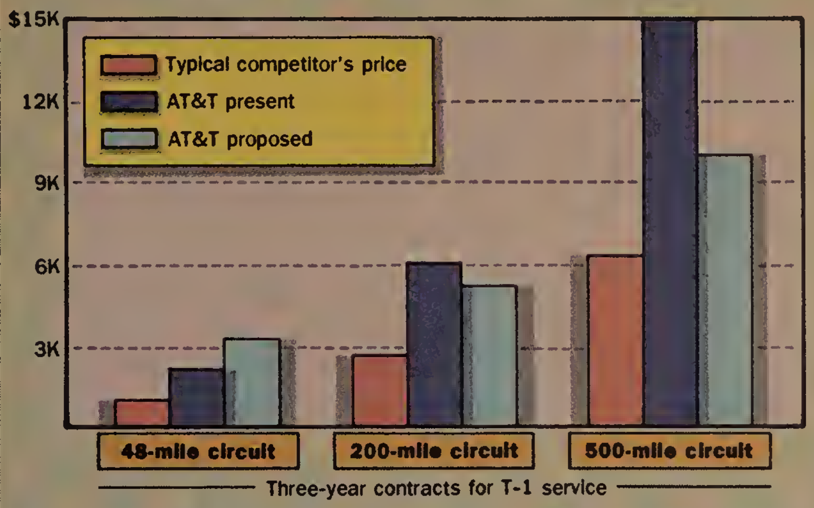
NETWORK DESIGN

Private nets best bet

ICA study helps users draft five-year strategic plans.

A five-year outlook: Dedicated networks still best bet for large users



AT&T's T-1 tariffs remain above rates of competitors that offer all-fiber networks, but competition is accelerating fiber implementation and driving down T-1 costs. The decline of T-1 rates is one of the key factors cited in an ICA-sponsored study that concluded private networks will continue to be more efficient than even advanced switched services for large corporations.

SOURCE: ECONOMICS AND TECHNOLOGY, INC., BOSTON

BY BOB WALLACE
Senior Editor

NEW ORLEANS — Although ISDN and other advanced switched-network services are coming of age, private networks will continue to be the best alternative for large corporations for the next five years, according to a study commissioned by the International Communications Association (ICA) and released to *Network World* last week.

The study, "Strategic Planning for Corporate Telecommunications in the Post-Divestiture Era: A Five-Year View," was commissioned by ICA's Telecommunications Public Policy Committee (TPPC) and made available to ICA members at the association's annual meeting

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NETWORK MANAGEMENT

LU 6.2 lacks monitor tools

BY PAUL KORZENIOWSKI
Senior Editor

When a performance bottleneck emerged in his company's prototype LU 6.2 application, Dick Boyle, assistant director of computer services at The Travelers Corp., spent three weeks trying to track down its cause.

Like other large companies experimenting with IBM's peer-to-peer communications protocol, Travelers sailed into uncharted waters when it began working with LU 6.2. Use of LU 6.2 has preceded the development of tools needed to manage applications based on the protocol.

"Clearly, performance monitor vendors have not yet stepped up to address issues raised with LU 6.2 applications," said

See **LU 6.2** page 44

NETWORK LINE

News

▶ Telenet Communications Corp. takes the stage at ICA to announce that it has won three major private networking contracts worth $50 million. Page 2.

▶ A federal jury convicts a Texas man for selling stolen telephone access codes in a case that may make it easier for long-haul carriers to crack down on costly toll fraud. Page 2.

▶ Despite DEC President Ken Olsen's assertions to the contrary, many observers feel Ethernet has no place in MAP networks. Page 2.

▶ Rolm President Ray Abu-Zayyad, appearing for the first time before the National Rolm Users Group, talks about the company's future but is silent on future product directions for the CBX. Page 2.

▶ The ICA salutes three user companies for their inventive approaches to telecommunications problems. Page 4.

Features

▶ In Part 1 of our special pullout section, two experts, one a user and the other a vendor, discuss the past, present and future of network management. Page 18.

NEWSPAPER

TOLL-FREE FRACAS

US Sprint enters 800 service fray

BY PAM POWERS
Senior Editor

NEW ORLEANS — US Sprint Communications Co. last week announced its entry into the toll-free 800 service market, joining MCI Communications Corp. and a few other carriers in the fight to wrest a share of this lucrative, fast-growing business from AT&T.

Speaking at a press conference at the International Communications Association conference here last week,

See **US Sprint** page 46

MULTIVENDOR NETWORKS

IBM as integrator

Firm unveils plans, products.

BY PAUL KORZENIOWSKI
Senior Editor

NEW YORK — IBM last week outlined aggressive plans to widen its role as a systems integrator and unveiled a slew of products, including enhanced networking software and its first mainframe software programs that conform to the recently unveiled Systems Application Architecture (SAA).

The announcements came during a press briefing called to introduce new models of the company's mainframes.

Although IBM has been involved with systems integration for some time in certain market segments, last week's announcement

See **IBM** page 44

▶ *PRIVATE NETWORKS*

Telenet scores with three big net contracts

BY KARYL SCOTT
Washington, D.C. Correspondent

NEW ORLEANS — Telenet Communications Corp., the data communications subsidiary of US Sprint Communications Co., last week announced it has won three major private networking contracts valued at $50 million.

The contracts, with the Department of Defense's Defense Communications Agency in Reston, Va., United Technologies Corp. of Hartford, Conn., and Sumitomo Corp. of Tokyo, were announced by Telenet President Paolo Guidi at the International Communications Association meeting here last week.

The awards are a competitive coup for Telenet and mark the fruition of its recently outlined strategy to provide customers with complete data network solutions. "Although Telenet made its reputation in the packet-switching market, we provide solutions that integrate packet switching and other communications technologies our customers need," Guidi said.

Telenet's $27 million contract with the Defense Communications Agency calls for the company's Federal Systems Engineering Consulting group to provide engineering and planning services to help the agency bring as many as 20,000 new host computers and terminals onto the Defense Data Network (DDN) over the next five years, said Tyrone Smallwood, technical representative with the contract office of the agency. DDN links Defense Department agencies worldwide.

Telenet will not provide any hardware or application software for use in DDN. It will analyze DDN and its subnetworks, including the Advanced Research Projects Agency Network and the Military Network, and it will recommend changes necessary to support additional equipment and new applications, Smallwood said.

The private network Telenet will build for United Technologies will interconnect the company's

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▶ *FACTORY NETWORKING*

Ethernet role in MAP nets questioned

BY PAULA MUSICH
Senior Editor

Although Ethernet may be useful for some Manufacturing Automation Protocol applications, most observers feel the technology lacks the noise immunity, distance capabilities and accuracy factory networks require.

The idea of using Ethernet in factory networks that comply with the MAP protocol was recently proposed by Digital Equipment Corp. President Ken Olsen. Olsen maintains that Ethernet is an adequate alternative for broadband MAP technology.

"Users are familiar with Ethernet, and the technology is substantially simpler to install and maintain than broadband technology," said Robin Harris, manager of industrial networks marketing at DEC. "Broadband is attractive for large manufacturing environments, where people can cost-justify the network on data transmission and other uses.

"For smaller users, cost-justification is not as easy, and a lower cost solution is very attractive," Harris said.

Cost aside, Ethernet may not fulfill MAP performance requirements. "When GM went through standards selection back in 1979 and 1980, 802.3 [the standard for Ethernet] was one of the considerations," said David Scott, division manager of Computer-Integrated Manufacturing (CIM) services at Deere & Co. in Moline, Ill.

"There were studies done on performance characteristics, especially under heavy traffic, that could be seen in a real-time mode on a factory floor. For performance, noise immunity and so on, 802.4 [the standard for token-passing bus networks] was, and still is, the selected method," said Scott.

Broadband coaxial cable was

See **Ethernet** page 43

▶ *LONG-DISTANCE*

Toll fraud trial sets new tone

May be first jury finding for abuse.

BY JOSH GONZE
Staff Writer

DALLAS — The recent jury conviction of a Texas man for the theft and sale of long-distance access codes may make it easier for long-haul carriers to stem the tide of toll fraud, which costs the industry an estimated $500 million a year.

On May 11, a U.S. District Court jury here found Dallas resident Jack Brewer guilty on two counts each of trafficking and possession of telephone access codes stolen from Texas National Telecommunications, Inc. (TNT), a Texas long-distance carrier. Brewer was charged under a section of the federal Comprehensive Crime Control Act of 1984.

Sources close to the case said Brewer may be the first person to be convicted by a jury for toll fraud in the U.S. The case is also seen as important because it indicates growing recognition of toll fraud as a serious crime.

Brewer was selling the stolen codes, which telephone callers use to access long-distance circuits of carriers other than AT&T and which those carriers use for billing, according to Terry K. Ray, the assistant U.S. attorney who prosecuted Brewer. TNT officials said use of the stolen codes cost the company $30,000.

Ray said he met with representatives of MCI Communications Corp. last week to discuss the investigative techniques used to apprehend Brewer and legal methods used to win the conviction. Brewer will be sentenced by a judge on June 4 and faces a maximum sen-

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NetWare is the constant that salvages several users' LAN investments. **Page 33.**

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Massachusetts looks into T-1 as a way to link state agencies across LATAs and save $10,000 a month. **Page 35.**

NEW PRODUCTS AND SERVICES

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Network World wants to make its news coverage better, and for that we ask your help. If you know of an interesting event that just occurred or is about to occur, please call. We'd also like to know how you optimize your networks. Call Bruce Hoard toll free at (800) 343-6474.

▶ *NATIONAL ROLM USERS GROUP*

NRUG hears AbuZayyad

BY BOB WALLACE
Senior Editor

NEW ORLEANS — Members attending the National Rolm Users Group's (NRUG) annual business meeting here last week said newly appointed Rolm Corp. President Ray AbuZayyad assured users that the Rolm name will not disappear, but he declined to comment on future product directions.

Meeting with NRUG for the first time since replacing former Rolm President Dennis Paboojian in April, AbuZayyad called for the creation of a user advisory council, according to NRUG members interviewed after the meeting by *Network World*. The council would comprise technical and research and development personnel from Rolm whom users could contact on technical issues.

NRUG members said AbuZayyad did not commit to a specific date by which the council would be created, but said he would like it to be set up as soon as possible. A Rolm spokesman said AbuZayyad formed a similar user advisory council during his tenure at IBM.

NRUG President Charles Garrison said AbuZayyad addressed user concerns about the future of Rolm. "He assured NRUG members that the Rolm name will not disap-

See **NRUG** page 6

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LONG-DISTANCE SERVICE

MCI cuts rates by 4.8%

BY JIM BROWN
New Products Editor

WASHINGTON, D.C — MCI Communications Corp. said last week it will keep pace with AT&T by reducing rates for its switched long-distance services by 4.8% starting Aug. 1.

The move comes in response to a similar rate cut AT&T filed with the Federal Communications Commission on May 15. US Sprint Communications Co., which is also expected to follow suit, said it will wait for the FCC to approve AT&T's cuts before reacting.

The price-cutting actions are in response to the reduction in access charges long-distance carriers pay to connect to local telephone companies. Carrier access charges are being reduced as monthly subscriber line charges are increased. Shifting part of the access-charge burden to consumers lowers a carrier's operating costs, which must be reflected, according to FCC rules, in its long-distance rates.

An MCI spokesman said equal access to local telephone company switching offices is allowing the company to benefit from the reduction in access charges. He also said MCI's better knowledge of the rate-cutting cycle, as well as reductions in other operating costs, have allowed it to plan for this rate reduction.

Affected by the cuts are MCI's small business discount calling plans, Prism Plus and the Prime Calling Option. Prism Plus is a switched WATS-like service, and Prime Calling Option is comparable to AT&T's Pro America III. The AT&T service provides customers with a flat percentage monthly discount for a fixed monthly fee.

Also affected are MCI's direct-dial long-distance services, the coded-access Dial-up and equal-access Dial 1 services, and calls made with the MCI Card, a calling credit card.

"It was an obvious and necessary move," said Mike Hills, president of HTL Telemanagement Ltd. of Burtonsville, Md. "This particular cut should not hurt MCI's revenue that much. Basically, it's just a cost reduction for them, and they're passing it on."

The rate reduction is closing the price gap between switched long-distance service and dedicated line services. That trend is making analysts look for reductions in dedicated line services later this year.

The rate reduction is closing the price gap between switched long-distance service and dedicated line services. That trend is making analysts look for reductions in dedicated line services later this year.

"We expect drops in dedicated long-distance access services later this summer," Hills said. He claimed an accounting change implemented by AT&T is expected to bring down the cost for its dedicated line access services.

Analysts also said they are looking for another round of rate reductions this summer when AT&T files to adjust its rate of return, or allowable profit, downward to compensate for certain financial gains it will garner from changes in the tax law.

On the far horizon, further decreases in access charges are also expected to be implemented by April 1989. Those decreases will spur further long-distance rate reductions and increase consumer-paid subscriber line charges another 90 cents per month. ◪

INDUSTRY INSIGHTS

Codex to market IPX

Reportedly gets 8% stake in StrataCom.

BY PAM POWERS
Senior Editor

NEW ORLEANS — Codex Corp. announced last week an agreement with StrataCom, Inc. to resell StrataCom's T-1 multiplexer, a move designed to add a voice component to Codex's wide-area data networking product line.

Codex will sell the StrataCom Integrated Packet Exchange (IPX) as the 6290 Integrated Digital Exchange, according to a company spokeswoman. The 6290 will cost $18,500 and will be available in September. The IPX is a voice and data switching T-1 multiplexer that employs so-called fast packet technology.

Neither company would disclose the value or duration of the OEM agreement.

In addition to marketing rights for the IPX, Codex also reportedly acquired an 8% equity interest in StrataCom. While Codex declined to comment on that, Howard Anderson, managing director of The Yankee Group, told *Network World* the equity investment was part of the deal.

In the near term, the spokeswoman said, Codex will sell the 6290 as it is made by StrataCom. In

See **Codex** page 7

INTERNATIONAL COMMUNICATIONS ASSOCIATION

Users group salutes innovative firms

BY MICHAEL FAHEY
Senior Writer

NEW ORLEANS — The International Communications Association (ICA) saluted three innovative user companies during its 40th annual convention held here last week.

The users, selected from a group answering a call for submissions issued last November, presented creative approaches to different telecommunications problems.

For First Wisconsin National Bank of Milwaukee — which won a *Network World* User Excellence Award this year — the AT&T divestiture and banking deregulation provided the challenge of responding to changing business opportunities in an uncertain communications environment, according to Robert Harrold, assistant vice-president at First Wisconsin.

Following divestiture, AT&T predicted the bank's communications costs would skyrocket. Instead, the company has improved the quality of its service while maintaining predivestiture costs.

The bank, which serves the needs of 27 affiliated banks and provides check-processing and other financial services to roughly 185 other client banks, accomplished this by employing up-to-the-minute technology.

Besides use of fiber links to T-1 facilities and a Bell operating company to support integrated voice and data transmissions, First Wisconsin uses channel-extension equipment that enables its mainframes to drive laser printers and check sorters at remote sites as if they were locally attached.

The bank's backbone consists of four T-1 lines linking network hub sites in four different local access and transport areas.

The bank controls the entire network using a sophisticated network control center that employs network performance software developed in-house, which is used in conjunction with IBM's Network Performance Monitor. "It's really exciting when we discover a problem even before the banks do," said Michael Spillane, manager of network operations.

Harry LaFoe Jr., electronic systems engineer for Marathon Oil Co. in Lafayette, La., found an innovative solution to a rate hike by South Central Telephone Co. that threatened to make foreign exchange service between New Orleans and a site on the Gulf of Mexico prohibitively expensive.

LaFoe discovered that the proposed per-minute usage charge South Central wanted to impose on

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NETWORK WORLD

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ICA '87

Study: T-1, LANs in wide use

But users express doubt about ISDN.

BY KARYL SCOTT
Washington, D.C. Correspondent

NEW ORLEANS — Nearly two-thirds of the users responding to a survey conducted at the International Communications Association (ICA) conference here last week said they are using local networks and T-1 equipment but have no plans for implementing Integrated Services Digital Network technology.

The Big Eight accounting firm of Coopers & Lybrand conducted an informal survey of about 150 ICA members, who represent some of the largest communications users in the U.S. The survey, dubbed "Trends in Communications Management," reported that most communications users have implemented the advanced network building blocks, such as local networks and T-1, that will allow them to leverage communications as a strategic resource.

Two-thirds of the respondents said they had implemented local-area networks and T-1 multiplexing equipment. That number is expected to rise within the next year to 85% for nets and 75% for T-1, according to the survey findings.

Respondents said they view local nets and T-1 equipment as advanced networking systems until ISDN solutions become commercially available. Users also expressed great uncertainty about ISDN. Two-thirds said they have no plans for implementing ISDN and are waiting to see how the technology develops.

"This indicates that the vendors have quite a marketing and selling job to do in order to win user acceptance of ISDN," said Thomas Y. Rush, national director of telecommunications technical services for Coopers & Lybrand.

A formal management study conducted recently by Coopers & Lybrand found that most large U.S. companies are implementing strategic business plans on an international scale. Yet the ICA survey last week found that only about one-third of those surveyed have worldwide networks. "This may indicate that the communications function is not yet integrated into the strategic corporate planning process of many users," Rush said.

"What we see is that, in many organizations, the CEO wants to extend business operations to Hong Kong, while the telecommunications manager is still struggling to extend the corporate telecommunications network to the United Kingdom," Rush said. "Upper management doesn't always understand what's involved on the operational level."

Thirty percent of the users surveyed said the top communications executive in their company reports to the information systems manager. Another 8% said the communications executive reports to a chief information officer. Twenty percent said that person reports to a chief financial officer and 13% said the communications manager reports to the chief executive officer. Twenty-nine percent of those surveyed said that the manager reports to another executive, who may be the facilities manager.

More than five out of six respondents said electronic mail will be in use in their companies within the next 12 months, and three out of four reported that voice mail will be adopted in the same period, signaling the increasing market penetration of these services.

SOCIETY OF TELECOM CONSULTANTS MEETING

STC eases restrictions

Members get OK on software sales.

BY MICHAEL FAHEY
Senior Writer

NEW ORLEANS — The Board of Directors of the Society of Telecommunications Consultants (STC) last week agreed to ease the group's stringent membership regulations temporarily to allow consultants to sell certain types of software products.

The board's action came after STC members, gathered here for the group's spring meeting, failed to rally the two-thirds vote needed to change the STC's bylaws. Some 60 STC members voted on a proposal to modify the bylaws to allow STC member consultants to sell software they have developed.

The issue is part of a larger ethical debate that has raged within the STC for years over whether consultants should be allowed to market anything other than advisory services to clients.

Current STC canons prohibit the sale by consultants of hardware, software and other nonconsulting services. Some STC members worry that allowing consultants to act as vendors compromises their impartiality, but others say consultants should be allowed to provide whatever products or services clients request from them.

According to Michael Dillingham, newly elected STC executive vice-president, the members' vote on approving the sale of software missed the two-thirds majority necessary for approval by only one vote. But because a majority of members approved the measure, the 12-member board voted to allow software sales temporarily until STC members can again vote on the matter at the group's fall meeting in Quebec City.

Under the measure approved by the board, STC members can sell only software they have developed themselves, and sales of such software cannot constitute more than 10% of a consultant's annual revenue, according to Dillingham, who is executive vice-president of Comsul Ltd. in Houston.

Prior to last week's meeting, a questionnaire was sent to STC members asking whether the STC's definition of an independent consultant should be changed ("Members weigh shift in STC's rigid canons," *NW*, April 13). According to the current STC bylaws, an independent consultant is "financially and organizationally independent of any organization that manufactures, distributes or sells telecommunications equipment, devices or transmission services."

During the meeting, held in conjunction with the 40th Conference and Exposition of the International Communications Association, participants debated amending STC's bylaws to allow members to sell a variety of products, including software and telecommunications hardware. But as the debate progressed, the issue was narrowed to include only the sale of software developed by consultants. The software products involved are principally analytic tools used in network design and optimization, according to Dillingham.

In addition, the STC members discussed the formation of a two-tier classification structure for consultants. One classification would include so-called "pure" consultants who offer only advisory services. A second category would include consultants who also market products. No action

See **STC** page 44

NRUG hears AbuZayyad

continued from page 2

pear, that the company will not leave telecommunications and that Rolm will continue to develop PBX products," Garrison said.

Garrison and NRUG officer Frank Schoff said AbuZayyad would not comment on new product directions for Rolm's CBX private branch exchange or on speculation that the next release of the CBX would be part Rolm PBX and part IBM front-end processor.

Garrison said he believes the introduction of a new CBX with both PBX and IBM 37X5 front-end processor capabilities is "a very real possibility." He added that such a product would likely touch off serious turf wars in corporations where telecommunications and data communications departments do not report to the same manager.

"That would create a tremendous battle over who would own this box in my company," Garrison predicted. "I could see this telecommunications/MIS battle going all the way to the top echelon of management."

Schoff said users pressed AbuZayyad on Rolm's current policy of refusing to permit third-party companies not affiliated with Rolm to provide maintenance and support services for Rolm equipment — a policy Schoff said has angered many users.

Besides its own maintenance force, Rolm will only permit its equipment to be serviced by customers or Rolm distributors. He said AbuZayyad would not commit to changing that policy.

"Users feel Rolm has been too rigid in its practice of not allowing other companies to offer maintenance and support services," he said. "This issue is a thorn in the side of users. Although I got the impression Rolm might be willing to consider allowing third parties to provide PBX maintenance services, the company still has not changed the policy."

Garrison said Rolm users also expressed concern about IBM's joint marketing practices. He said he has heard of instances where Rolm users were barraged by joint Rolm/IBM sales teams pitching voice and data communications gear.

"The users group has reported cases where individual users were overwhelmed by people seeking to make presentations on IBM products," Garrison said. "The effect of this has not been positive."

Users also pressed the Rolm president on other corporate identity issues. Some users asked why Rolm employees working in the IBM booth at the International Communications Association show here last week wore IBM identification nameplates. Garrison claimed that the new Rolm president promised that Rolm employees manning future trade show exhibits would wear Rolm tags.

According to Garrison, NRUG is continuing to strengthen its relationships with Guide and Share, established IBM users groups. "As president of NRUG, I sit in on Guide's board meetings. I am looking for a similar arrangement with Share," he explained.

He added that Guide has approved plans for a joint NRUG/Guide conference to be held in the fall of 1988.

In an effort to offer stability in a time of uncertainty, Garrison said, many NRUG officers will remain in their current posts for another year. Garrison will remain president of NRUG, and Donna Turcany from the American Medical Association will continue to serve as executive vice-president of the users group.

Only one of NRUG's four vice-presidents, Bill Hanson of National Car Rental Systems, Inc., stepped down. Pat Springer of Holly Farms Poultry Industries, Inc. will replace Hanson. Schoff will continue as vice-president of committees, and Jay Silverberg of Eastern States Bankcard Association will remain vice-president of administration and finance. Linda Virden of Macy's California, Inc. in San Francisco will remain as vice-president of membership.

▶ *ICA '87*

Two Fujitsu PBXs bow

BY PAM POWERS
Senior Editor

NEW ORLEANS — Fujitsu Business Communications last week reemphasized its commitment to the private branch exchange market with two new PBXs that round out its existing product line at the high and low ends.

Sandwiching Fujitsu's flagship Focus 960 PBX will be the two new models: the 196, which supports 50 to 150 lines, and the 9600, which supports 2,000 to 10,000 ports. Fujitsu declined to state prices for the products.

The 9600, a distributed nonblocking digital switch, provides switched voice and data access to public and private networks, including T-1 networks. The switch supports synchronous transmission at speeds up to 64K bit/sec and asynchronous transmission at speeds up to 19.2K bit/sec.

A Fujitsu spokesman said that, in addition to standard PBX options, the 9600 has networking features such as AT&T's Electronic Tandem Network compatibility and multistage queuing.

The company emphasized the switch's downward compatibility with the Focus 960, which supports 100 to 2,000 lines. The 9600 can be expanded without reconfiguration.

Fujitsu expects the 9600 to go into beta test this August. The switch will be available in limited quantities in 1988 through its direct sales offices, selected dealer networks and some of the regional Bell holding companies. General availability is scheduled for 1989.

Fujitsu's low-end entry, the Focus 196 PBX, offers simultaneous voice and data transmission, nonblocked, for up to 240 stations. The system also provides three types of proprietary terminal support. It is not compatible with the 9600.

The 196 is available in limited quantities now, with volume shipments commencing in July. The spokesman said Fujitsu will distribute the 196 through the same direct sales, RBHC and dealer networks.

"Fujitsu obviously realized it needed to expand its product line to the low and high ends," commented Doane Perry, senior analyst with International Data Corp. in Framingham, Mass. "The company has two strong entrants here."

Codex to market IPX

continued from page 4

the future, however, Codex will add value to the product by developing interfaces for the IPX so that it will fall under centralized network management with other Codex products.

The StrataCom deal represents a move by Codex to strengthen its already strong position in the wide-area network market.

Although Codex currently resells an Avanti Communications Corp. T-1 multiplexer as its 6240, the spokeswoman said the StrataCom multiplexer adds a strong voice component and provides an easy migration path for the Codex customer base.

Codex will also develop its own T-1 products in the next few years, the spokeswoman said. The product line will include a range of digital multiplexers and concentrators, all of which will fall under common network management, she added.

Codex's networking strategy

An integral part of Codex's networking strategy will be cooperative research and development projects with its parent company, Motorola, Inc., particularly in the development of Integrated Services Digital Network products.

StrataCom's role in widening Codex's multiplexer offerings will be mutually advantageous for the two companies, analysts said. StrataCom, in particular, should benefit from the exposure it receives through the well-established Codex.

Dick Moley, StrataCom's president and chief executive officer, said the Codex deal will "help significantly" by lending credibility to the fast packet technology of the IPX. "The IPX is tremendously economical, but it's new," said Moley, and users are often leery of unfamiliar technologies. The Codex endorsement of the switch should increase sales for StrataCom, he predicted.

Since its incorporation in 1986, StrataCom has shipped 40 nodes to 12 customers, including Hewlett-Packard Co. and May Department Stores Co. Moley said his company "may end up with more than one resale agreement," but that direct sales is, and will remain, the primary distribution channel.

StrataCom definitely wants to maintain its direct sales, Anderson said. "The company wants the first cut at the customers for itself."

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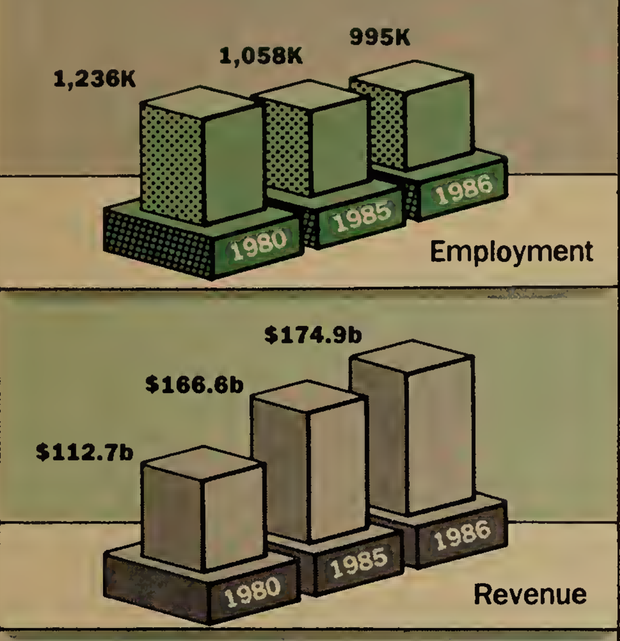
INDUSTRY UPDATE

> “In addition to other common problems, AT&T and IBM/Rolm [Corp.] are both facing concerns caused by poor product revenue performance and product integration problems. Both firms are feeling the pinch of slowed growth in core businesses combined with price wars. AT&T in particular is coming out of a very bad year on the unregulated side, with little relief in sight.
>
> **“IBM, AT&T, and Northern Telecom: Strategies for Telecom Supremacy”**
> CTPS, Inc.
> Mountain View, Calif.

Telecommunications industry overview



SOURCE: COMPUTER AND BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION, WASHINGTON, D.C.

ANALYSIS

BELLCORE vs. RBHC R&D

Holding company research doesn’t replace consortium’s.

BY KARYL SCOTT
Washington, D.C. Correspondent

LIVINGSTON, N.J. — When Bell Communications Research, Inc. initially learned that some of the regional Bell holding companies were forming their own internal research and development groups, it began to wonder if its days were numbered.

BELLCORE, the R&D consortium jointly owned by the seven RBHCs, has been the primary source of R&D for the RBHCs since divestiture.

But in recent weeks, Southwestern Bell Corp. and US West, Inc. both announced the formation of their own R&D groups to develop technology to compete in new nonregulated businesses. Other RBHCs employ engineers and scientists to perform in-house research not conducted by BELLCORE. Nynex Corp., for example, established its Science and Technology department shortly after divestiture.

“It was inevitable that the regionals would form their own R&D groups,” Irwin Dorros, vice-president of technology services at BELLCORE, said in a recent interview.

“The RBHCs are high-tech companies that were born at the time of divestiture with virtually no technology development capabilities. The formation of these new internal R&D divisions is a response to that. The RBHCs feel they must branch out into new businesses to remain viable, and they need proprietary R&D to do that,” he said.

Dorros does not, however, anticipate a conflict with the regionals as they broaden their technological scope.

“I don’t think this means that the RBHCs are going to stop funding the work BELLCORE does for them. I don’t know of any RBHC that is using its internal research group to duplicate BELLCORE research,” Dorros said. “With the tremendous market opportunities developing in telecommunications, there’s no way BELLCORE alone can provide the RBHCs with all the research they need.”

Several of the RBHCs agree. “Our Science and Technology division is not designed to replace BELLCORE,” said Walter Johnston, director of prototype services at Nynex. “We are a strong supporter of BELLCORE. We see our role as picking up where BELLCORE leaves off.”

BELLCORE’s strength is in sharing research with all seven companies and providing a substantial cost savings as a result of joint research. The research concern performs network planning, procurement support and application development for the regulated, local-exchange side of the RBHCs’ businesses. It also implements standards in the design of new network architectures, ensuring that each RBHC network can interoperate with the others.

But BELLCORE must share its research with all the RBHCs, unless retained under special contract to do research for one company. As the RBHCs diversify and compete in new telecommunications markets, their need for proprietary research will increase.

As Southwestern Bell Chairman Zane Grey said in the announcement of his new Technology Management Group, “We need an R&D group to help us succeed in the competitive marketplace and to maximize our technical innovations.”

Increased competition jeopardized BELLCORE’s role, Johnston said, “but I think it will frequently be in the RBHCs’ interest to develop certain technologies and standards cooperatively.”

The potential loss of RBHC support prompted BELLCORE to form a study group last year to look at future business relationships between BELLCORE and its owners, the terms and conditions of ownership, funding and the types of work BELLCORE is allowed to do, Dorros said. No conclusions have been reached.

While relationships between the RBHCs may change, “BELLCORE will remain an important asset to us for years to come,” Johnston said.

VENDOR VIEW

PAUL HIDY

PDN dial-out service is net boon

Vendors of public data networks (PDN) are offering a new dial-out service that provides another way to establish device-to-device connections through their networks.

Although PDN customers could always use dial-up connections to link their terminal and personal computer equipment to packet networks, host or destination equipment has always had to be permanently linked to the network with dedicated lines. But users who only occasionally needed to transfer important data to destination devices could not cost-justify the dedicated link. The solution is to enable the network to call out to the destination device on an as-needed basis using a temporary dial connection.

With this new service, the device-to-device connection comprises a local dial connection, a packet data network circuit and a local dial-out connection. This is more bandwidth-efficient than a long-distance call, and the cost is lower, so additional applications become cost-effective.

This service meets the application requirements for three types of communications: personal computer-to-personal computer connections, infrequent connections to a central computer and central computer-initiated connections to remote asynchronous devices. Until now, the user has typically made personal computer-to-personal computer connections for file transfers with a long-distance call, since limited usage does not justify connecting a personal computer to the network.

To make the personal computer-to-personal computer connection with this new service, the user connects one personal computer to the network through a dial-up access port, then establishes a session to the network node with dial-out capability in the local calling area of the destination personal computer.

The user sends the phone number of the destination personal computer to the node, and the node dials out to make the connection. The user receives the benefit of lower costs because, unlike long-distance charges, PDN network charges are not distance sensitive.

The service could also be useful in applications that require only infrequent connections to a central computer.

With central computer-initiated connections to remote asynchronous devices, a dial connection between the network and the destination device is especially useful. In this case, the central computer, connected via X.25 to the PDN network, is the origination point, and destination devices may be host computers, receive-only printers in a distribution or manufacturing facility or desktop personal computers. The device must have an asynchronous modem and a phone line.

The central computer sends an X.25 call-request packet with a destination address of the dial-out node, then commands the node to connect to the remote device. Files can be uploaded or downloaded, or reports printed at printers — whatever is required by the application. When the session is complete, a clear-request packet terminates the call.

This new network service can be used for the immediate delivery and collection of time-sensitive data or for the overnight delivery and collection of non-time-sensitive data. It will prove to be an important addition to current PDN services.

Hidy is senior product manager for Tymnet/McDonnell Douglas Network Systems Co.

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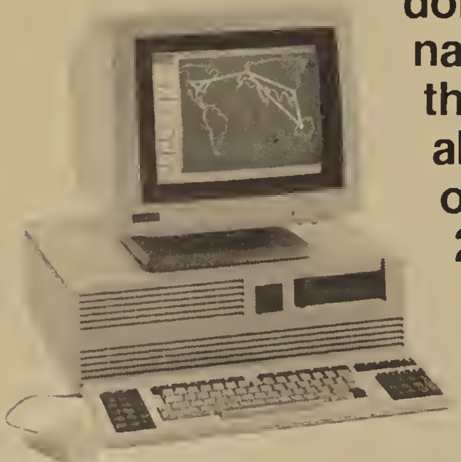

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TELECOM TRENDS

Globenet links up to Bell Atlantic's PDN

Globenet, Inc., an interexchange data carrier, has begun connecting its network to Bell Atlantic Corp.'s Public Data Network (PDN), a packet-switching service. Users hooked to the regional Bell holding company's PDN or Globenet's system will soon be able to transmit data from New Jersey to national and international destinations.

NETWORK DECISIONS

Bechtel drafts plan for networking future

BY KARYL SCOTT
Washington, D.C. Correspondent

ATLANTA — The communications management at Bechtel Group, Inc. is working to implement a unified voice and data network strategy in an era when corporate revenue and employment have fallen by about 50%.

Although Bechtel is still putting the finishing touches on the strategy, the company has decided to migrate all its voice traffic to a virtual network and has decided to use AT&T's Starlan and Information Systems Network (ISN) to support data communications at its headquarters and at field sites worldwide.

O. Ray Pardo, telecommunications manager at Bechtel Eastern Power Corp. in Gaithersburg, Md., outlined the objectives and results of Bechtel's communications strategy in a presentation to the Network Users Association meeting here recently.

Bechtel's networking strategy was influenced by the major operating changes affecting the company. Companywide employment has dwindled from 44,000 workers in 1981 to 18,000 today, Pardo said. In the last five years, Bechtel sold off a number of its office buildings in San Francisco, Los Angeles, Houston, Ann Arbor, Mich., and Washington, D.C. and moved into leased space.

Management also knew that the network would have to support the diverse needs of engineers and corporate administrators who change offices on an average of 1½ to three times a year.

These factors, coupled with rapidly evolving technology, influenced the networking decisions made by Bechtel's communications managers, Pardo said.

In its most recent communications decision, Bechtel decided to put all of its voice traffic onto a virtual private network. Bechtel is opting for a virtual network largely because 60% of its voice calls go to Bechtel customers at off-network locations. The company hopes to award that contract within the next few months, Pardo said.

For wide-area data networking with remote company facilities, Bechtel has decided to take its data traffic off of its Satellite Business Systems private network and lease high-capacity 56K bit/sec terrestrial transmission facilities from a long-distance carrier. A contract award will

See **Bechtel** page 14

CROSS TALK
BOB WALLACE

Getting help from the horse's mouth

Before undertaking a major equipment or network installation, communications managers should consider creating a steering committee comprising representatives from other key departments in the corporation.

According to communications managers, this helps them better understand the needs of the company's end users while simultaneously giving the communications department greater visibility within the company.

Don Pero, corporate telephone systems manager for Rochester Gas & Electric Corp. in Rochester, N.Y., said use of steering committees helped him speed the completion of large telecommunications projects. "Use of steering committees also helps you create credibility within other parts of your company," he added.

Pero, who has 37 years of telecommunications experience, said steering committees have also provided valuable feedback from end users. Information received from end users often delineates their individual communications requirements as well as specific concerns about how use of new equipment may change their work habits.

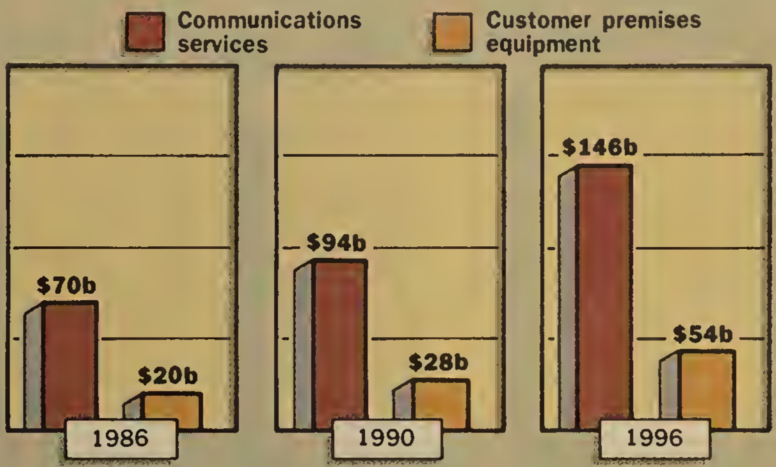
"The communications manager really has to get a vivid picture of what end users need from a specific project before beginning a PBX or a network installation," Pero said.

When he assembles a steering committee to assist him with a large project, Pero tries to pull together those with technical experience that can be used on the project. "For example," Pero said, "I always try to put an engineer from the company's data group on the steering committee."

Placing end users on the steering committee also helps educate different departments in the organization about various aspects of the planned project. Another communications manager, who requested anonymity, said managers can use steering committees to learn how to present themselves to others outside of the immediate department.

"Participation in a steering committee allows the communications manager to develop a well-rounded understanding of the business skills needed to survive in the business world," he said. ◻

Projected communications services and customer premises equipment market



Communications services include telecommunications, computer and information services.

Customer premises equipment consists of private branch exchanges, key telephone systems, PBX add-on gear, computer terminals, modems, multiplexers, facsimile machines and teleconferencing gear.

SOURCE: FROST & SULLIVAN, INC., NEW YORK

ICA CONFERENCE

NTI airs additions to product lines

DV-1, MS-1 get enhancements.

BY BOB HAMEL
Senior Editor

NEW ORLEANS — Northern Telecom, Inc. beefed up the conference-calling capabilities of its Meridian DV-1 switch and larger MS-1 digital conferencing system and released several other DV-1 enhancements at the International Communications Association conference held here last week.

New features for the Meridian DV-1 include a network version of the DV-1 Meeting Communication Services (MCS). The networked MCS allows up to 24 users on DV-1s, linked using voice lines and X.25-based data transmission facilities, to participate in electronic meetings.

With the network option, users on geographically dispersed DV-1 systems can participate in audio/graphic conferences and have access to all other DV-1 screens involved with the conference call.

Availability of the MCS is targeted for October 1987. A 12-port system costs $15,000, and a 24-port system costs $24,500. The network option for DV-1s configured as remote nodes — meaning they do not have the hardware necessary to host a conference — costs $7,000. The X.25 Gateway Option, if required, costs $7,440.

The Meridian Telemarketing System was also announced for the DV-1. The software supports up to 24 telemarketing agents or supervisors per DV-1. The system is available now in one- to eight-user, nine- to 16-user or 17- to 24-user versions. Depending on configuration, the pricing ranges from $4,000 to $10,000 per user, including hardware, software and autodialer.

Message Center and Physicians Message Center are two new products designed to operate on a Meridian DV-1 behind a host telephone system.

The Message Center is an automated telephone message-handling application for general business office environments that enhances directory services and telephone messaging for Northern Telecom's Meridian SL-1 and other customer telephone systems.

When used with DV-1 M4000 terminals, the application

See **NTI** page 14

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NETWORKING

Bechtel drafts plan for future

continued from page 11

be made soon, Pardo said.

Engineers in Bechtel's field operations need to access corporate data bases to exchange information such as design drawings and personnel data, and to track the ordering and delivery of supplies for construction projects. The company is relying more and more on the personal computer as the workstation of choice to access wide-area networks as well as local networks.

The advent of the personal computer has enhanced the way Bechtel functions and has driven the development of personal computer networks throughout the corporation. In 1981, Bechtel had 2,000 terminals. Today, it has 3,100 personal computers and terminals, and that figure is expected to increase to 6,000 by next year.

"The PC gave us the ability to process information more quickly and efficiently, but it also created many new complex communications problems," Pardo said.

The advent of the personal computer has enhanced the way Bechtel functions and has driven the development of personal computer networks throughout the corporation. In 1981, Bechtel had 2,000 terminals. Today, it has 3,100 personal computers and terminals, and that figure is expected to increase to 6,000 by next year. "The PC gave us the ability to process information more quickly and efficiently, but it also created many new complex communications problems," Bechtel's O. Ray Pardo said.

To support all the personal computers, Bechtel is adopting Starlan local networks, which use standard twisted-pair wiring found in most of the leased offices Bechtel occupies. The personal computer networks utilize Novell, Inc. file server software, which has proven to be easy to use and provides good security, Pardo said.

Mid-level networks used to connect VAX engineering systems were designed using Ethernet software. Bechtel deployed an AT&T ISN as a data switch to route traffic between mainframes, Starlan networks, Ethernet systems and asynchronous terminals.

Interoffice communications runs at 9.6K bit/sec and officewide at 56K bit/sec for engineering systems. The personal computer local-area networks run within an office at 1M bit/sec. The ISN switch processes 48,000 packets of data per second.

"Our objective was to give any user access to all facilities in the corporation and reduce costs," Pardo said. "We think we've succeeded, while integrating various digital networks and adopting international standards." ◻

NTI airs product line additions

continued from page 11

allows attendants to perform directory lookup and send messages. The application can activate message-waiting indicators on telephone handsets used with both the Meridian SL-1 and AT&T System 75 and System 85 private branch exchange. The message center also enables operators or message attendants to do directory lookups by name, alias, extension or title and department, and take text messages using the M4000 and special preprogrammed keys for common messages.

The cost of Message Center differs according to configuration, but an average five-terminal system with associated printers costs roughly $50,000.

The Physicians Message Center application for hospital environments provides telephone answering, registry, referral and automated telephone message center capabilities for hospital staff and hospital clients/patients.

The base price of the Physicians Message center is $54,000. The base line answering service is included in the price of the system, but additional software options are priced separately. The physician registry software, for example, costs $10,500. Both are available.

Also announced at the show was Release 2.0 of the Meridian MS-1, a digital voice conferencing system that supports up to 48 users and can be used with most PBXs, or associated with Centrex service.

This release of MS-1 offers expansion from 18 to 24 and 48 ports, and use of up to four attendant consoles. The system can be connected to a host switch using a variety of trunk types, including digital T-1 facilities and analog ground start and four-wire E&M trunks.

Shipments are scheduled for September 1987. Prices vary depending on configuration and trunk types, with a base list price of $33,950 for an 18-port system, $60,950 for a 48-port system. ◻

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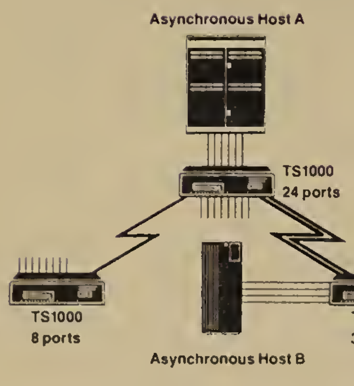

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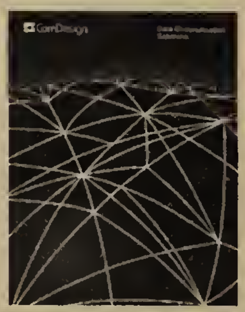

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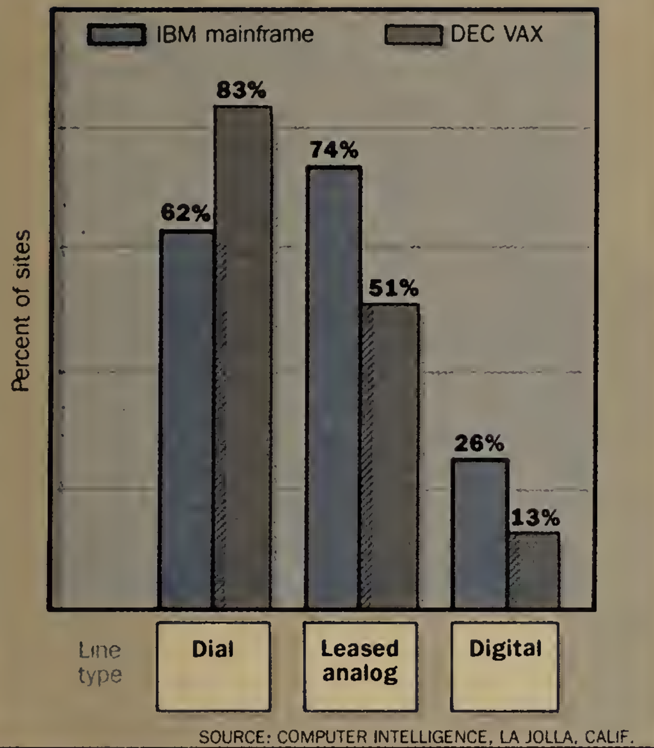
> “Users should be very concerned about the lack of network management tools available for LU 6.2 networks. Current control tools were not designed for LU 6.2 types of applications. In some cases, users will have no way of knowing who is logged onto the network.
>
> **Thomas W. McDonald**
> Partner
> MGT Technology Group
> Natick, Mass.

Communications line usage: IBM vs. Digital Equipment Corp.



SOURCE: COMPUTER INTELLIGENCE, LA JOLLA, CALIF.

FACTORY NETWORKING

ALCOA installs MAP 2.1

Caps 5-year, $1 billion factory modernization plan.

BY BOB WALLACE
Senior Editor

PITTSBURGH — The Aluminum Company of America's (ALCOA) Tennesee plant will soon have one of the industry's first factory floor computer networks compatible with Version 2.1 of the Manufacturing Automation Protocol.

Two additional ALCOA plants — the six million square-ft Warrick plant outside of Evansville, Ind., and the four million square-ft Davenport, Iowa manufacturing facility — will also be equipped with the broadband MAP-compatible networks as part of a $1 billion, five-year factory modernization effort begun in 1982.

Version 2.1 of MAP improves offers several improvements over Version 2.0, including streamlined messaging formats, improved file transfer capabilities and other application layer improvements.

The metal magnate's Tennessee plant currently hosts a 30-node MAP network produced by Industrial Networks, Inc. (INI). A total of seven DEC VAX and MicroVAX computers are hooked to the net, which is scheduled to be fully operational in July. The network, which is used to control ALCOA's automated materials handling system, consists of several cranes and automated guided vehicles that transport 30-ton steel coils throughout a one million square-ft portion of the facility.

The ALCOA facility's MAP net, which operates at 10M bit/sec, serves as a highway between shop floor devices such as the cranes and the plant's DEC computers. Kenneth Main, se-

See **ALCOA** page 16

IBM INSIGHTS

What's new with PU 2.1? Last June, IBM announced Advanced Program-to-Program-Networking (APPN), which provided a way to link devices such as the System/36 and System/38 in a peer-to-peer fashion within Systems Network Architecture, without requiring an IBM mainframe. But IBM has since given out conflicting signals concerning the evolution of the new architecture.

As announced, a key component of APPN was PU 2.1 capabilities, which enable lower level processors to route messages between peer processors without involving a mainframe traffic cop. Although the company originally claimed there were differences between APPN and PU 2.1, recently those differences have become murky.

Also, PU 2.1 capabilities were closely linked to various software packages, such as IBM's Distributed Data Manager (DDM), in the June announcement. But recently, IBM has hinted it would include PU 2.1 capabilities as a part of the communications software, such as VTAM, and divorce it from specific software packages such as DDM.

Since APPN flies directly in the face of SNA's hierarchical design, analysts speculate that IBM is having trouble sorting out the networking issues raised by the new architecture. Each solution raises yet another problem.

An outstanding area of concern is network management. In a traditional SNA network, the host was always the management focal point. In a peer-to-peer network, there is no focal point. Users may have difficulty isolating a link problem with a connection that passes through a number of APPN nodes.

The Token-Ring explained. Communications Solutions, Inc. (CSI), based in San Jose, Calif., recently published “Understanding the Token-Ring,” a report that explains the role the local-area network will play in IBM's SNA network. The report analyzes Token-Ring Network characteristics, performance and operation. Topics discussed in detail include network operational sequences, error conditions and recovery, multiple ring bridges, gateways and application program interfaces. CSI is selling the report for $335, and more information is available at (408) 725-1568.

How important is Systems Application Architecture? Michael Killen, president of Killen & Associates, Inc. in Palo Alto, Calif., claimed Systems Application Architecture (SAA) is one of three strategic announcements, the others being IBM's 370 operating systems and SNA.

See **IBM** page 16

DATA DIALOGUE

BY HOWARD BERNSTEIN

The ABCs of IBM's Network Performance Monitor: Part 3

Last of a three-part series.
This concludes a discussion of IBM's Network Performance Monitor, which identifies network traffic bottlenecks and collects performance data.

As outlined in previous discussion, IBM's Network Performance Monitor (NPM) does not initiate the collection of Response Time Monitor (RTM) data from the 3X74 controllers, nor does it process the raw data from the controllers. As Network Logical Data Manager (NLDM) receives the RTM data at the System Management Facility (SMF) log, NPM at the same time provides an SMF exit routine that makes the SMF RTM records available to NPM. The NPM exit routine is placed in common operating system storage, and its function is to intercept the SMF records.

The SMF/RTM records created by NLDM are copied to the NPM buffers that are also in the common operating system storage. Once the records are copied, NPM reformats the SMF/RTM record into an NPM Session Record, which is then written into the NPM session file.

In addition, summary session records by NCP, line, physical unit and application are also written to the NPM file. The records may now be viewed by the NPM operator using the NPM Online Analysis or the NPM Graphic Subsystem.

Although NPM is an integral part of IBM's total Communications Network Management (CNM) strategy, network managers looking for performance monitoring tools are not limited to IBM's NPM. Third-party vendors, such as Tesdata Systems Corp., have entered the performance monitoring market. The customer now has a choice, but must understand the various options and know important questions to ask vendors.

The following list suggests some product capability questions to ask the vendor. If a response time is reported, are other users being affected? In such cases, other questions emerge. Are they using the same network components? Are they in session with the same application? Is the response time problem related to the application or the network? Do performance alerts or monitors give indications of load vs. network capacity problems? If so, do they relate to the current response time problem?

Does the product provide frequency of transactions from a particular set of users? Does the product indicate what capacity a network component must have to handle new or changing loads? How many devices will be necessary to handle the new load? What is the rela-

See **NPM** page 16

Bernstein is editor of “SNA Perspective,” a monthly newsletter published by Communications Solutions, Inc. in San Jose, Calif.

ALCOA installs MAP 2.1

continued from page 15

nior staff electrical engineer for ALCOA's Tennessee Operations, said the factory's materials handling vehicles and the DEC computers send as few as 60 or as many as 250 short control messages back and forth per hour.

The senior electrical engineer said the MAP implementation project was a complex and resource-greedy undertaking. "The user has to be the systems integrator," Main said in reference to the work involved in interconnecting factory floor equipment made by such vendors as DEC, Industrial Networks, Simpact Associates, Inc. and Hitachi Ltd.

Main said he did not have a large specialized staff dedicated to the installation of the MAP net. "My staff was outside vendors," he remarked.

Main attributed much of the cost of the MAP project, which he would not reveal, to the installation of the broadband network components. The MAP-based automated materials handling system has replaced overhead cranes and the manually operated forkloader trucks that used to roam the plant floor.

ALCOA representatives began attending the MAP/TOP User Group meetings in 1984 as the first step of the preimplementation program for the ALCOA Tennessee plant. Those involved in the MAP project attended two- to three-day monthly meetings to determine the size, structure and content of the messages that would travel over the MAP net.

In 1986, ALCOA sent letters to its factory network gear providers informing them preferential treatment would be given to those vendors capable of developing and delivering MAP-compatible products.

Unlike many corporations that prefer the wait-and-see stance on MAP, ALCOA chose to join an elite fraternity of users who are implementing MAP in their production facilities. ALCOA's factory specialists sold the MAP project by explaining MAP as a utility similar to water and electricity. ☑

ABCs of NPM

continued from page 15

tionship between response time, load and component capacity for my network? What is the average transaction size and transaction time for a line, physical unit, virtual route, application and a list of logical units, to assist in capacity planning?

These are just a few of the fundamental capabilities of performance monitoring. A third-party vendor must be able to provide the answers to these questions, if the customer is to have any reasonable level of confidence in the performance monitoring software.

It is important to recognize that network management involves much more than just analyzing and solving network component failures. The dominant concern behind the use of products like NPM is the potential dollar savings that can be achieved by increasing network efficiency.

Although these goals are desirable, there are critical hidden factors that accompany the selection of any product. The issues include operating system requirements, minimum hardware needs and quality of the product's documentation.

Managing and controlling the SNA networks is not possible without sophisticated tools, skilled personnel and a corporate commitment to its success. The search tool's effectiveness must be weighed against the additional management, personnel, equipment and operating expenses that they incur. ☑

IBM from **page 15**

Killen takes a close look at SAA in a 180-page report, "IBM's SAA Strategy: Impact and Opportunities," which will be published next month. The report explains SAA and outlines opportunities for software developers and users.

The author said SAA represents a carefully conceived long-range strategy by IBM to reestablish account control among its traditional customers. Killen said SAA is needed by IBM customers, is based on sound technology, is practical and is destined to succeed. Additional information concerning the report is available at (415) 323-3842.

Yet another IBM networking newsletter. Systems Strategies, Inc. has jumped into the newsletter business with "Datacomm Review," a bimonthly publication concentrating on IBM networking issues. The premier issue is scheduled for next month and will examine IBM office automation architectures. Future issues will delve into IBM's Token-Ring Network and the International Standards Organization's Open Systems Interconnect model. Columns in each issue include news briefs, analysis of technical trends, IBM update, Big Blue communications announcements and guest viewpoint, a column in which industry mavens present their views. Additional information is available at (212) 279-8400. ☑

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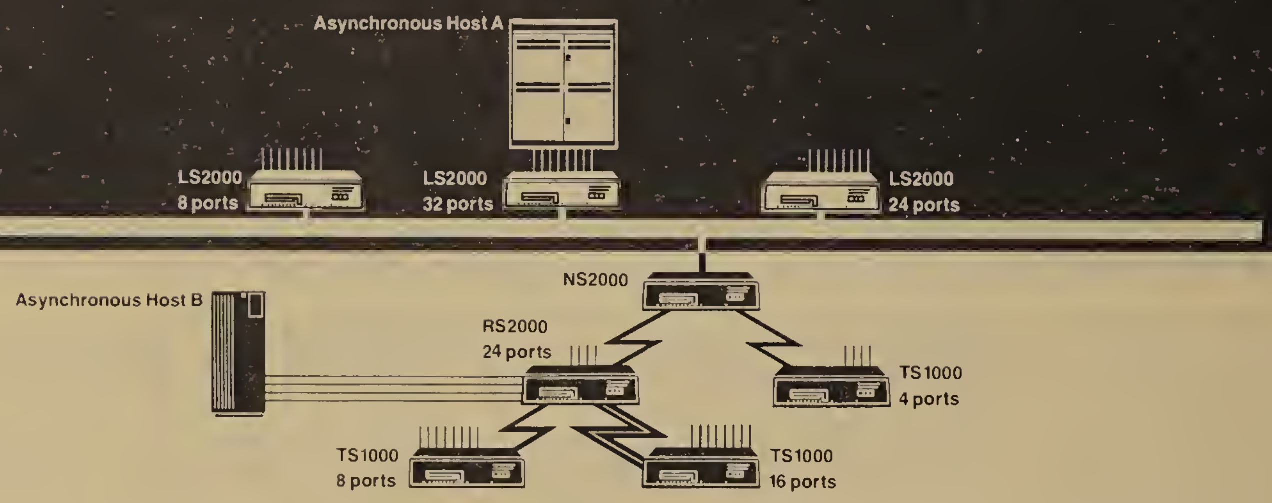

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NETWORK WORLD

SPECIAL PULLOUT SECTION

MAY 25, 1987

Network Management

Network management is the most complex and divisive topic in the communications industry. Users, inundated by proprietary black boxes and software, need an interface standard that will help them achieve integrated management of multivendor voice and data networks.

In this section

• • •

User and vendor perspectives on network management are explored in this *Network World* roundtable discussion with David Edison, Westinghouse Corp.'s director of corporate information and communications systems, and Howard Frank, chairman of Network Management, Inc.
This page

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Here's the lowdown on IBM's belated but muscular entry into the network management arena. IBM-watcher Clare Fleig, International Technology Group's director of systems research, explains Big Blue's net management strategies and details the differences between NetView releases.
Page 23

• • •

Even though the technologies for integrated network management exist now, the products currently available don't work together. Hector Myerston, supervisor of telecommunications analysis for SRI International, shows how net management techniques are evolving and discusses the need for interface standards.
Page 27

• • •

Like other hot communications technologies, network management has spawned a bewildering array of new buzzwords. In this brief primer, *Network World* Senior Editor John Dix categorizes products and defines key network management terms.
Page 31

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A user and a vendor diagnose today's network management problems in this special Network World *interview. On the right is David Edison, director of corporate information and communications systems at Westinghouse Corp. in Pittsburgh. Edison, a perceptive and well-read manager, was recruited from London by Westinghouse in 1962.*

At left is Howard Frank, chairman of Network Management, Inc., an integrated network management systems company in Bethesda, Md. Frank cofounded Network Analysis Corp., then later became president of Contel Information Systems before leaving in 1985 to pursue consulting and venture capital activities.

Frank and Edison recently shared their ideas about network management with Network World *Editor Bruce Hoard and Features Editor Steve Moore.*

Let's start by discussing how network management has evolved.

SPECIAL PULLOUT SECTION
Network Management

e separate network nagement yndrome

Frank: In the mid-1970s, people really didn't consider running networks to be the problem; the major obstacles were building them and getting them to work. Network management, if it was ever considered, was just an add-on, a frill.

In the late 1960s, a 1,000-terminal network with 350 or 400 locations was a big network. We've gone from a few hundred to a thousand to tens of thousands of terminals in modest-sized networks now.

The other thing that happened is that the end-to-end management of facilities by the telephone company has gone away. Today, if you look at the number of pieces of equipment in a line between a terminal user, a computer and another user, there are 20-odd different things in between.

Each one of those things has to be planned; each has to work, and each can fail and prevent communications. Keeping networks operating has become the central focus of network management, which I believe is the most interesting segment of the network business.

Edison: For about 15 years, our network belonged to the telephone company, and our job really was [to work as] a liaison with the telephone company. With divestiture, a variety of services appeared and

Continued on next page

From previous page

gave us more options. We found ourselves becoming more like an operating company, and more of the responsibilities of coordinating and operating the pieces became ours.

Now, much of our time is spent determining strategies and operating practices that enable us to optimize both price and quality in the network. We are pushing more toward the strategic use of the network, which means that we can't tolerate failures. Also, because of economics, we are being pushed into wideband services that put more down a single pipe, and again, the impact of failure is getting more serious. This has caused a tremendous interest in the topic of network management.

Frank: As networks grew larger, each of the vendors in the business discovered that they needed to manage their own segment. So we ended up with multiple network management systems, which, because each [vendor] was only managing a piece of the problem, ended up pointing out the difficulty of network management: Now you've got to manage the management systems.

How do you segment network management in terms of product categories or functions?

Frank: I think you should look at it in terms of functional categories first. Think about a network's life cycle. The first stage is the strategic planning stage, understanding where it fits into the business. Next is the requirement stage, followed by the design stage and the procurement stage, where you write RFPs, evaluate vendors and so on. Then comes the building stage, the cutover and the operational stage. Finally, it goes back to the beginning because it gets augmented. Network management is the process of making all those stages play together.

Edison: Our network actually evolved from the 18 separate networks we had 15 years ago. We had our private-line data network for our larger IBM systems; we had an entirely separate voice network, and we also introduced new services such as our electronic mail service. This created a number of product opportunities, and one of them was a new category of products that allow you to interface between different existing systems.

Carrying [Binary Synchronous Communications] traffic over X.25 networks is part of this, and I would put T-1 multiplexers into this category.

Today, we have good data/voice integration in transmission. We put a multiplexer ahead of the PBX, split off voice and then route the data into its area and the voice into its area. There's a whole class of products that allow us to make these interfaces. Also, products that enable us to anticipate problems and find out the health of the network are very important for us.

Is the emphasis on network management creating any new job titles?

Edison: We created the title of manager of network quality and reliability. In the past, it was always possible to reroute, so if our suppliers ran into a problem, they would simply work around it. As we bought things like T-1 circuits, it became less possible to reroute and we became much more concerned about the integrity of specific circuits.

The economics of T-1s aren't good enough to keep redundant T-1s standing by. So we're paying more attention to exactly what happens in the network and exactly who responds to it. This is the job of the manager of network quality and reliability. We use those terms to emphasize that this is what we are trying to achieve.

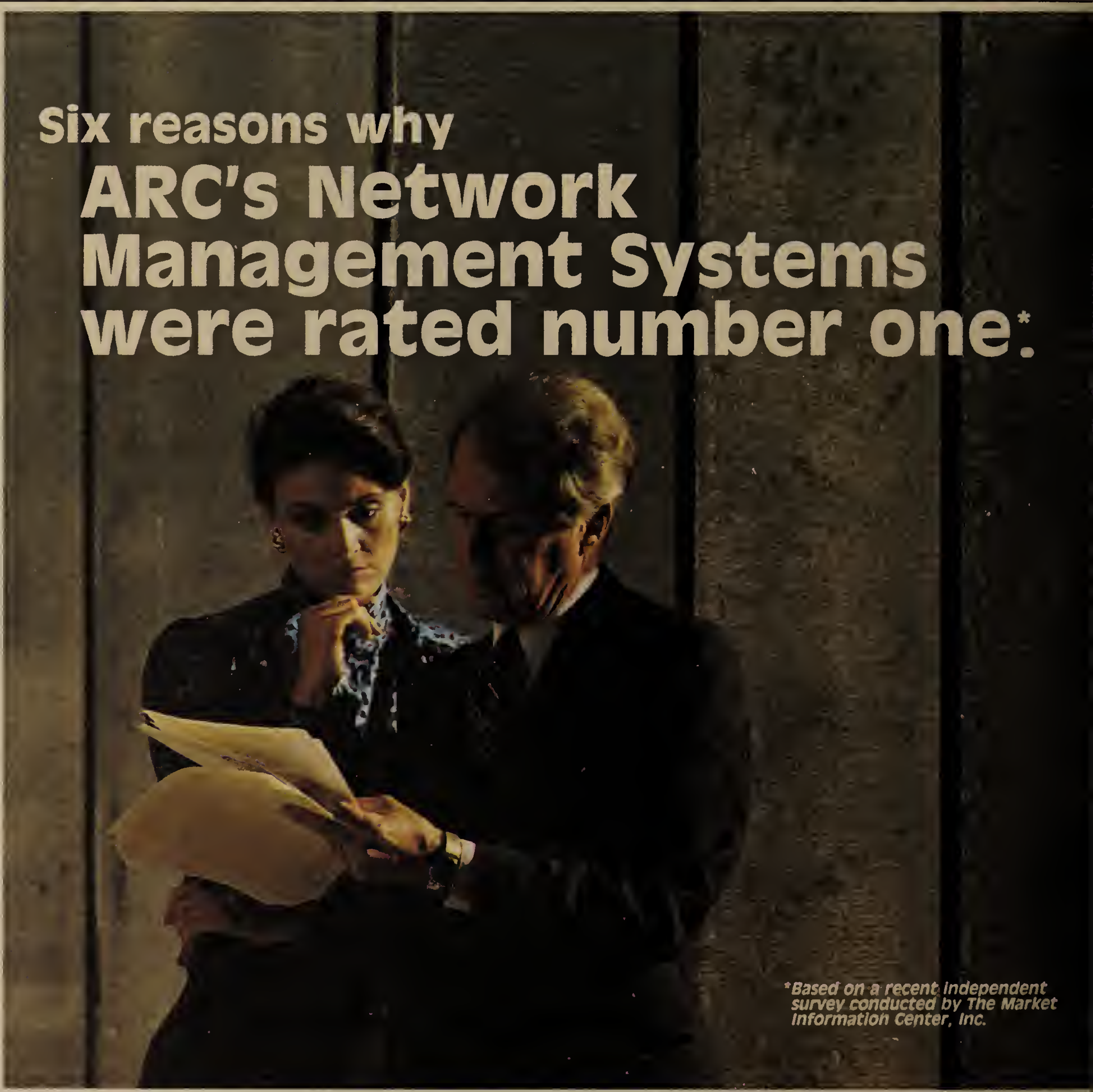
Are network control centers becoming more important as a result of today's emphasis on network management?

> "Network management is the process of making all [the network life cycle] stages play together."

Frank: I think the network control center is one of the focal points of what will happen next because, in the patchworks of networks that exist right now, you will find lots of network subcontrol centers full of different vendors' equipment.

One large company that I know of did not have a network control center. They had seven separate subnetworks in different locations. And they had differently trained people running each one of the subnetworks.

Their goal was to see if they could bring all of this together and make one coherent system that could be operated from one place. That's very hard. We looked at it and said, 'You're talking a multi-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million-dollar investment to make that happen.' I think ultimately most large companies will have systems that are pulled together through a network control center.

Edison: If you look at our network control center, you can see the performance of vendors and the performance of the system all pasted on the walls so that everybody is clear on what the objectives are.

Is network management a function that requires central control, or can it be distributed?

Edison: We have a network based in Pittsburgh, and for several reasons, there has to be central control.

One reason is simply that this is where we coordinate with our vendors. We have vendor staff in our network control center working alongside our own staff.

We also need people in remote locations because, as you fan out in the local nodes, it's necessary to have coordination with the vendors, and also, even in this day and age, it's necessary to have somebody on the end of the line. If you are trying to trace an outage or run tests, there is a limit on how much can be done on an automated basis.

> "I think what you will see is centralized management and distributed implementation."

Frank: I think what you will see is centralized management and distributed implementation. You may implement repair depots in lots of different locations and decentralize implementation responsibility, but centralized control over that process will be vital.

How do you assess the strengths and weaknesses of different vendors' approaches to network management?

Frank: One of the things that I notice is that each vendor is taking a very narrow slice of what they think the network management market is. It's either testing, diagnostics, data management control or whatever.

You need to have vendors with coherent plans for how they are going to put all those functions together. Not that they're going to do that in the next 12 months or so, but that they have a notion of where they are going to go. And they really have to have solid long-range plans so that when they start building their next generation of products, you don't have to throw away everything you got in the last generation.

Edison: The traditional telecommunications vendors tend to be very good with their voice networks. The traditional computer vendors, IBM in particular, tend to be very good with a special kind of data network. But there is nothing really putting the two together.

IBM doesn't offer to carry voice over its SNA network, and AT&T doesn't carry SNA over its Software-Defined Network. Large IBM networks and large voice networks are the two heavy hitters in dollar terms, and we have to figure out by ourselves how to put the two together.

The voice vendors handle the end-to-end part of data quite well by selling you transmission that meets the specs, but that's it. They sell you virtually nothing to help you create or run the network.

Frank: One refreshing thing is IBM's recognition that network management is a discipline that should at least be sold. And maybe they will actually deliver. The fact that they are going to bring in NetView and the Rolm [Corp.] architecture and that they are going to be open and publish specifications is an explicit recognition that this is the next important area for users. Also, they recognize that network management is going to sell their next-generation product line.

Is NetView going to end up competing against some kind of International Standards Organization (ISO) standard for network management the way Systems Network Architecture supposedly competes with the Open Systems Interconnect (OSI) model?

Edison: We had a presentation by AT&T on their plans in the network management area, and I understood that there is a proposed CCITT standard for network management, in which case there's a good chance there will be competition between NetView and whatever comes out [from the Consultative Committee on International Telephony and Telegraphy].

Frank: The problem with OSI and other standards is that, by the time they are actually agreed upon and adhered to, IBM will have long ago implemented whatever it is they are going to implement, and it will be a de facto standard.

So what if it is not going to be OSI? I'm not a purist about having

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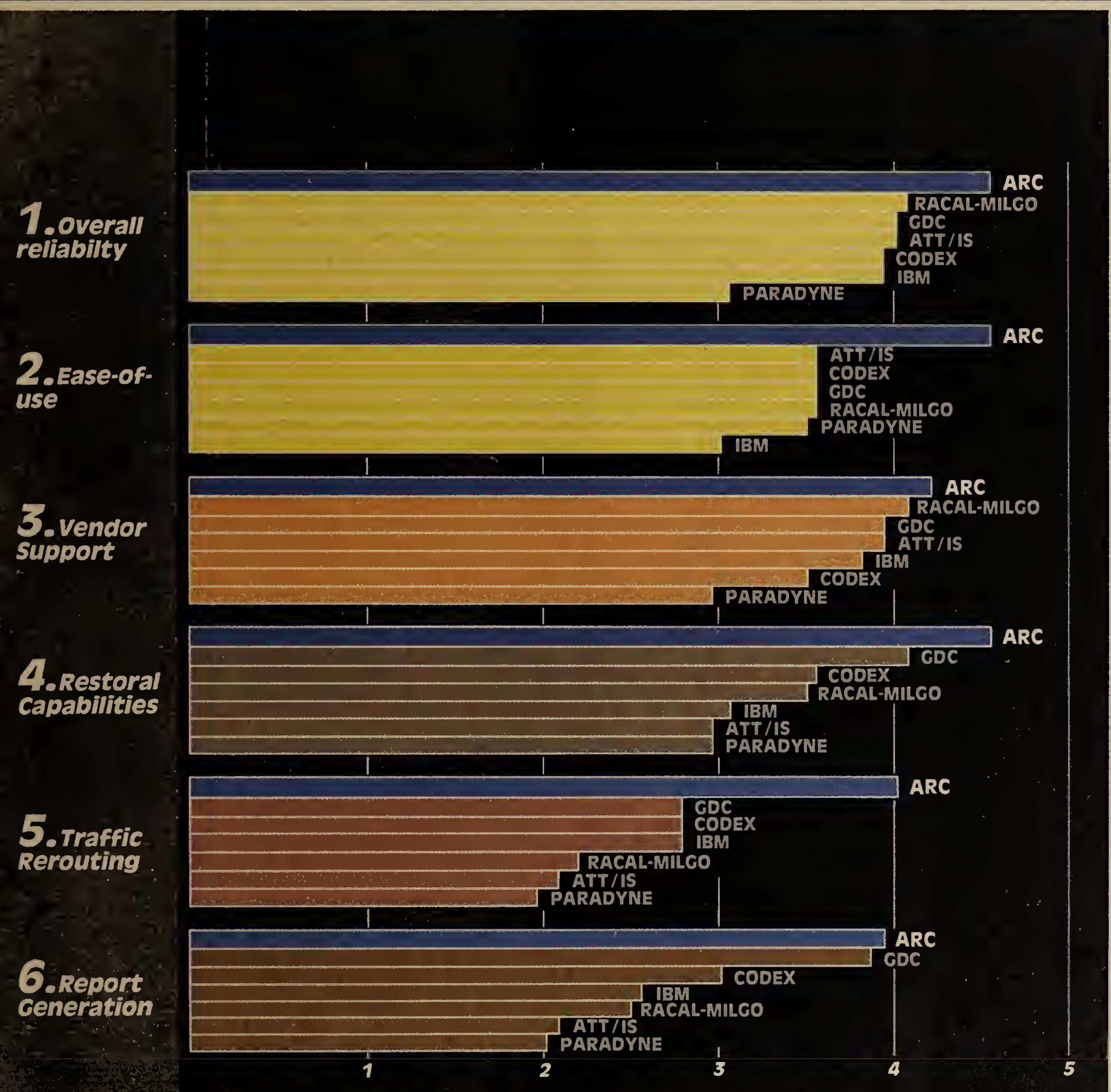

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From previous page

ideal standards. I think standards you can live with now are much more important than the best standards in the world.

Edison: I agree. People spend far too much time refining insignificant technical details while the rest of the world waits.

Network management capabilities are foremost among the bells and whistles that modem vendors are adding to their products. How much of a role can a modem play in network management?

Edison: Having modems that can be remotely controlled is important. But something we don't have today is enormously important, and that is a modem that fits into a standard so that I can use standard control signals to access it.

Today, a number of manufacturers are putting together proprietary systems that work well, but I end up with perhaps a half-dozen different modems that don't communicate.

Frank: That is the separate network management syndrome. Network management is probably a term that came out of modem network management.

Infinet, [Inc.] and a few other companies had the first network management products 10 years ago. It used to be that they were the network management field, and now they are only a piece of it.

You can't be in the modem business as a major vendor now without having a network management product. There are a lot of proprietary modems that do the same kind of thing, and it's not possible to differentiate them on their network management capabilities.

Edison: It makes life difficult, and actually, it reduces the size of the market, rather than protects their proprietary market.

What can be done to alleviate this separate network management syndrome?

Frank: The large users are beginning to recognize that there is a problem there, but recognition of a problem generally comes prior to establishing a budget to solve that problem.

At this point, and probably for the next four or five years, it will be a custom job to be able to put all this stuff together for any large network. Users have to bite the bullet.

What's the best way to categorize network management products?

Frank: There are devices that take microscopic measurements, and there are products that work in terms of telephone calls or measurements of whatever the unit of traffic is.

Then, at the next level, there are things that take those unit measurements and figure out what is happening in the network.

There is a fourth level at the very top that addresses the question, 'I've got all this stuff and the network is healthy and running on a minute-by-minute basis, but how do I modify it in order to make it better or make it work under changing conditions?'

In each of these categories, what are the interface problems users have to deal with?

Frank: Generally, none of them interface with anything, and it's left to users to make them all work together as a system. That's the problem.

Edison: There are many products that purport to subscribe to a standard, but when you really get down to it, what Howard says is right.

Frank: Typically, each product solves one functional problem: voice-traffic recording, data-traffic recording, line-error counting, protocol testing, modem testing, network analysis and optimization, and so on.

Then there are the diagnostic types of products that look at all these measurements and figure out what's happening in the network through use of artificial intelligence.

Edison: One of the interesting things for us is to use artificial intelligence, not to actually do the complex file diagnosis but just to indicate which, among a vast array of alarms, should be looked at.

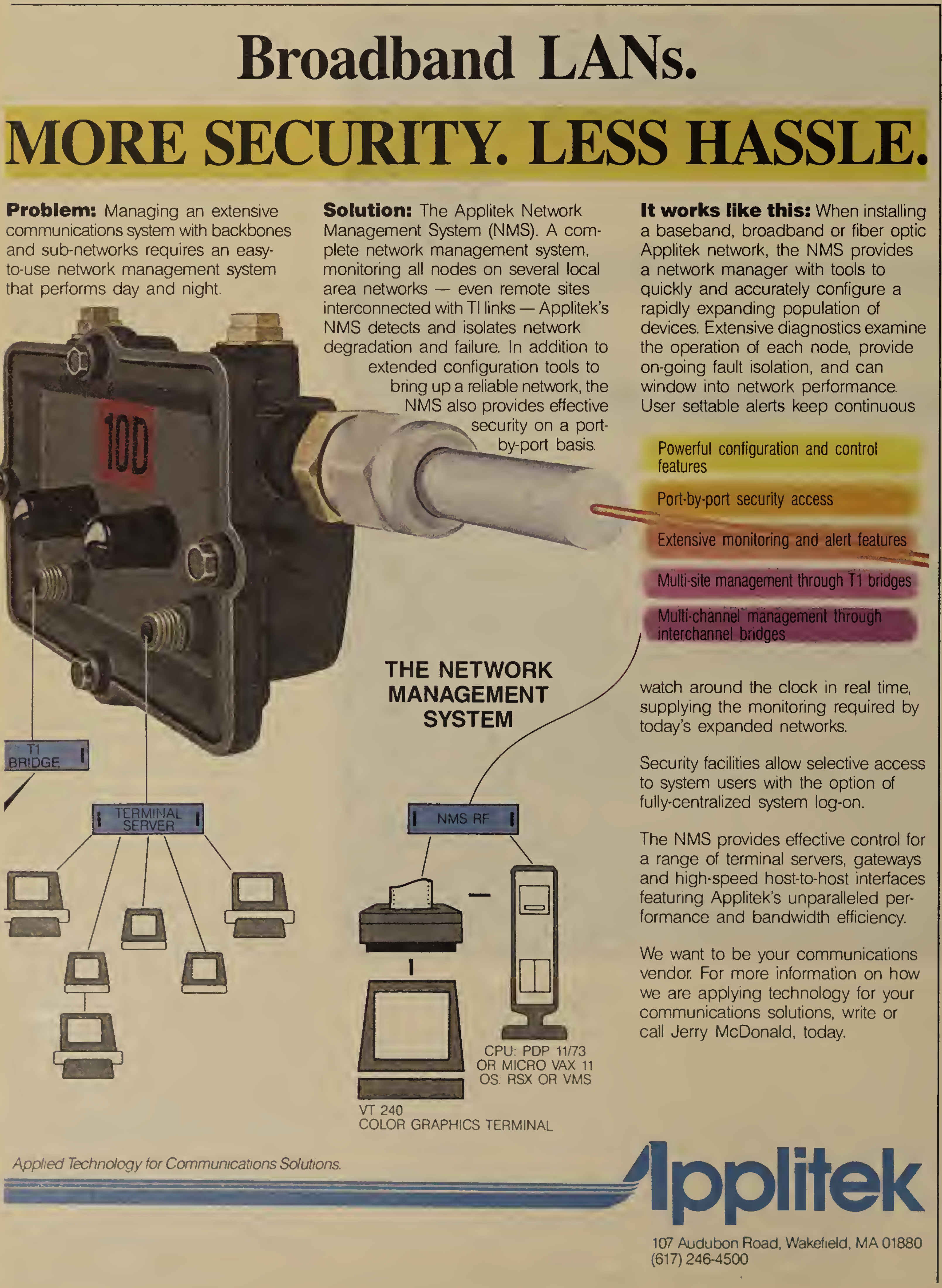
All of these switches and devices produce alarms that are of little interest from moment to moment. Artificial intelligence could perform a tremendous role by filtering out what we should look at from this vast amount of data.

What are the toughest organizational aspects of network management?

Edison: There is the issue of network administration. Some people have this concept of a network being something that one buys in a big box: 'The Westinghouse Network.' Let me tell you, the Westinghouse network is a living thing with tentacles being chopped off on one side and added to another side.

Sometimes 200 or 300 changes will take place in the space of a week. Because of the tariff changes, the traffic changes and the acquisitions and divestitures of

See **Syndrome** page 31



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SPECIAL PULLOUT SECTION
Network Management

Rhapsody in Blue

Big Blue begins to harmonize its customer network control capabilities.

BY CLARE FLEIG
Special to Network World

After years of languishing in the back rooms of data processing operations, network management has come into its own at IBM. Terry Lautenbach, vice-president and group executive of IBM's Information Systems and Communications Group, calls network management "the keystone of our strategy."

Introduced under the NetView umbrella, IBM's approach to network management is primarily an attempt to reconcile Systems Network Architecture to a multivendor environment and to build a new software revenue base.

Unveiled on May 20, 1986, NetView is a host-based network management and control system designed to provide comprehensive support of a customer-premises wide-area network linking data, voice, carrier and multivendor networks.

NetView consists of two basic components. One is an umbrella architecture for the development and implementation of network control and management applications via interfaces such as NetView/PC and NetView Application Programmer Interface/Communications Services (API/CS) in the host; the other is a set of applications used in the network environment.

IBM has positioned NetView for three strategic roles: as a marketing tool to promote sales of multivendor networks, as a set of sophisticated management applications and as a design tool for the creation of additional network management software tools.

Big Blue's introduction of NetView was both an offensive and defensive move. On the defensive side, IBM needed NetView to reclaim market share lost to third-party network management software vendors. On the offensive side, NetView provides a network management system foundation that offers host-based management of all current network processors, services and architectures, while providing the framework to integrate future network elements such as X.25 carrier links and Integrated Services Digital Network.

IBM has never been a strong software development company.

Continued on next page

Fleig is director of systems research at International Technology Group, a Los Altos, Calif., research and consulting firm specializing in the IBM market.

From previous page

Its network management programs have been heavily criticized by users as expensive, complex and inflexible. Among the 25,000 SNA license holders, effective network management remains a continuing problem. IBM's lack of a substantive offering in that category has allowed the establishment of a healthy third-party network management software market. NetView represents IBM's most aggressive attempt to alter that market balance.

Marketing tactics

In its initial release, NetView consisted primarily of repackaged IBM network offerings, aimed chiefly at streamlining current network management software programs and cutting end-user costs.

Both objectives appear to have been achieved. Prices announced for NetView operating system licenses were $949 for VM, $1,060 for MVS/370 and $1,255 for MVS/XA. This was a reduction of nearly 90% from previous prices.

IBM also eliminated the monthly licensing charges of $1,242 for MVS/XA, $1,086 for MVS/370 and $10,700 for VM/SP. The size and nature of the price cuts is a strong indicator of the degree of commitment IBM made to establishing NetView in the marketplace.

In addition to these price changes, IBM placed a new emphasis on specific monitoring services and ease of use for network administrators. The company also expanded the number and kinds of equipment that could be monitored through the network. Most significant were the 3720 Communications Controller, 3725 Network Control Program/Token-Ring Interconnection and support for Advanced Program-to-Program Communications/PC. All of these are foundation products for IBM. Support under NetView illustrates Big Blue's long-term commitment to the NetView umbrella.

IBM is positioning NetView more as a strategic control framework than as a set of network management programs.

IBM is positioning NetView more as a strategic control framework than as a set of network management programs. In this role, NetView is focused on enterprisewide networking with end-to-end management of voice, data and hybrid networks, supporting international standard interfaces. The system also provides central management, distributed control and services, and automated network management.

IBM is also marketing NetView as a way to control the customer's entire network.

NetView/PC is an IBM Personal Computer subsystem principally used for non-SNA and voice devices.

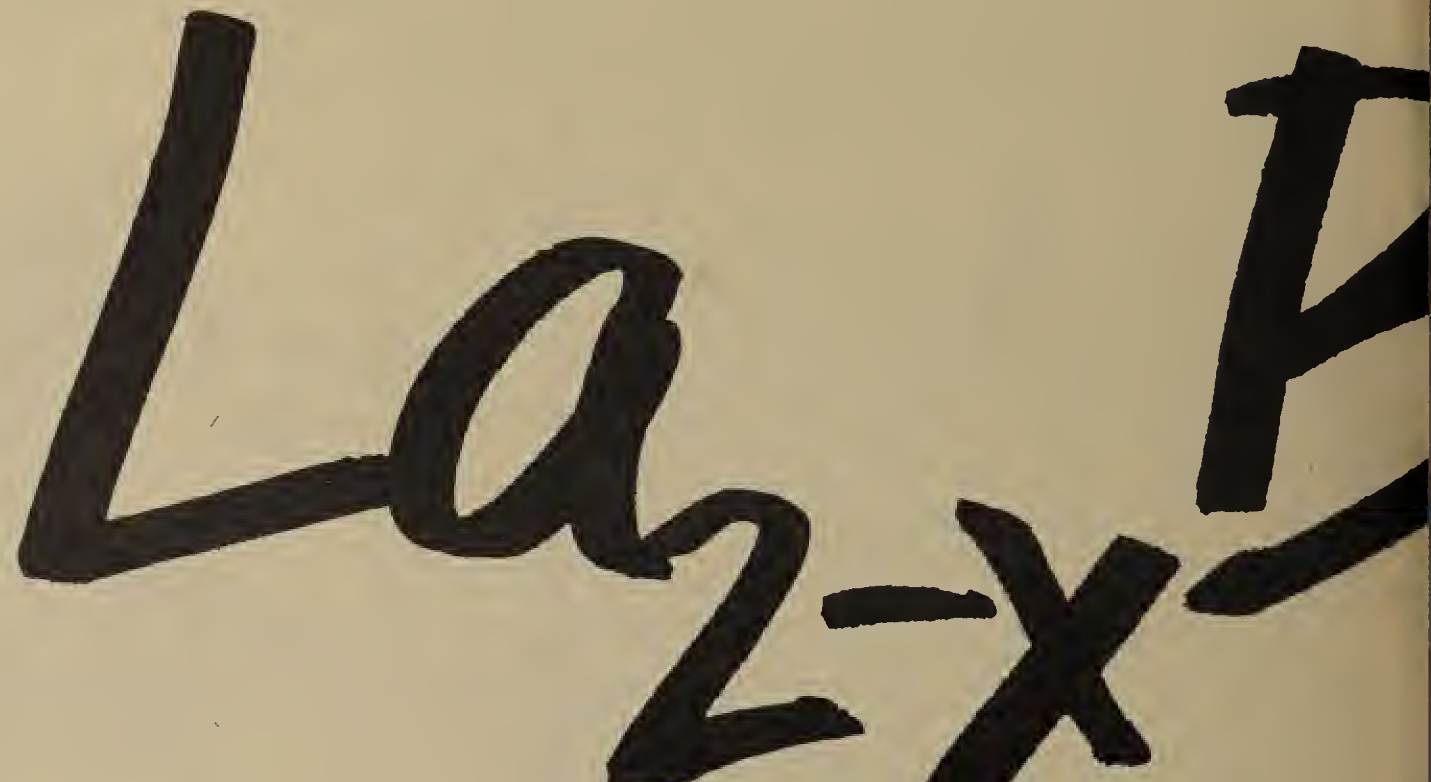
This tactic is aimed squarely at offering a great deal of comfort to IBM's traditional MIS mainframe customers, who want to maintain control of data, regardless of how and where it's transmitted.

IBM began developing this role last September with a set of major NetView enhancements. NetView/PC is an IBM Personal Computer subsystem that supports communication of network management information between a Personal Computer and NetView on the host. It is principally used for non-SNA and voice devices. Other enhancements include API/CS, which lets users write programs that communicate with NetView in an IBM System/370 environment, and a set of application programs for Personal Computers, hosts and Rolm Corp.'s CBX equipment, which support NetView management functions.

First release

IBM's initial release of NetView consisted of two announcements: the introduction of a set of host-based software modules for network management implementation and the first implementation of IBM's Network Management Architecture.

In the first announcement, IBM simply established the host portion



This is the formula for something that looks ordinary, but does something extraordinary.

It is a superconductor, a material that carries electricity with no loss of power. Until recently, superconductors worked only at extremely low temperatures, limiting their use.

In a major breakthrough, two IBM scientists discovered that this class of materials superconducts at a much higher temperature, raising the possibility of expanding this technology's use.

of the network management framework. This was accomplished by streamlining and repackaging existing control programs under a set of loosely defined facilities and monitoring modules.

When initially announced, NetView's central network management elements included:

- **Command Facility,** which incorporates the functions of the Network Communications Control Facility.
- **Session Monitor,** which provides access to network session information and incorporates the functions of the Network Logical Data Manager.
- **Hardware Monitor,** which incorporates the Network Problem Determination Application and collects and displays alerts, events and statistical data for network problem determination.
- **Status Monitor,** which incorporates VTAM Node Control Application to allow the operator to check network functions.
- **On-line Help Facility,** which incorporates the Network Management Productivity Facility and offers operational assistance to the network operator.

The publication of the NetView API enabled software developers to write programs to operate under NetView.

In the second announcement, IBM provided support for APPC/PC for its SNA environment and API to encourage third-party product development for NetView.

Support for the APPC/PC licensing program is offered under the Hardware Monitor, which extends the Personal Computer-based peer-to-peer networking elements of SNA to host-based software. This support was provided in advance of the introduction of NetView/PC in September.

The publication of the NetView API enabled software developers to write programs to operate under NetView. API development, by both IBM and third parties, serves two purposes: to allow the migration of older network packages to the new NetView monitoring system and to establish NetView as a crucial network link for the next generation of software applications.

The use of APIs as interfaces in network management and for all of IBM's mid-range, host and Personal Computer environments allows access to non-IBM environments without compromising the integrity of SNA.

Phase two

IBM's September 1986 NetView product announcement consisted of three key segments: NetView/PC, API/CS and a set of application programs for hosts, Personal Computers and Rolm CBXs to support NetView management functions.

NetView/PC provides the key communications interface between the NetView host network management environment and the Token-Ring, Rolm or private branch exchange-equivalent devices. All SNA and LU 6.2 services are supported via the program's Communications Manager. The three groups of services offered under NetView/PC are file management, communications management and multitasking facilities for IBM or Rolm applications; host file transfer between PC-DOS applications and NetView-based hosts; and general problem management, alert management and operator control services.

As incorporated in NetView/PC, API/CS provides the software interface between device-dependent applications and NetView/PC.

As incorporated in NetView/PC, API/CS provides the software interface between device-dependent applications and NetView/PC. It allows users or third-party developers to write application programs to manage PBXs, local-area networks, statistical multiplexers, T-1 multiplexers, X.21 and X.25 packet assembler/disassemblers and other IBM and non-IBM data/voice transmission devices.

The five support programs announced for NetView/PC, two Per-

Continued on next page

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This discovery, by J. Georg Bednorz and K. Alex Müller, has sparked an explosion of research that could yield profound change. In fact, many think that if remaining obstacles can be overcome, superconductors could lead to major advances in many areas of human endeavor, including computers.

IBM is proud of its scientists' innovative achievement.

Because innovation not only makes breakthroughs possible. It makes better products for our customers possible. IBM

From previous page

sonal Computer-based and three host-based, are:

- **NetView/PC Rolm Alert Monitor,** which works with NetView/PC to provide problem determination and alert management for Rolm CBX equipment.
- **NetView/PC Rolm Call Detail Collector,** which collects and logs call detail records from CBXs and selected PBXs. The program also checks the call records for alerts and relays the records to the host for processing.
- **NetView Network Billing System,** which provides an accounting of CBX costs and use by department, long-distance carriers and equipment.
- **NetView Traffic Engineering Line Optimization System,** consisting of five programs for analyzing call detail records received from the Rolm Call Detail Collector program. It is provided to determine telecommunications configuration options at the user's site.
- **NetView Tariff Data Base,** which provides U.S. long-distance carrier tariff information to help determine costs for the site's billing system and Traffic Engineering Line Optimization System.

Users want to see more pieces of the puzzle before making a long-term commitment to NetView.

Testing tepid waters

Among end users, the reception to NetView has been lukewarm. The concept has enough long-term strategic value for users to warrant evaluation, but most are taking the same tack as they have with the Rolm CBX under the Enterprise program and with the Token-Ring: They want to see more pieces of the puzzle before making a long-term commitment to NetView.

As it exists today, NetView must be considered as a strategic architecture, not as a product. Few of the applications introduced last May and September are available, and the full set of applications will not be available in volume until the third quarter of 1987 at the earliest.

Instead, NetView's role in SNA networks is primarily to aid in migration from a complex network management structure to a more cost-effective, streamlined environment.

Secondly, it is one of preparation for larger hybrid communications networks running voice, data, carrier and multivendor networks. IBM sees support of such networks as a key user requirement in the late 1980s.

The company's strategies for the evolution of NetView in the 1990s revolve around the two key themes of migrating products from the existing network management structure to NetView and developing additional applications for NetView internally.

IBM is likely to encourage migration of existing packages by increasing the functionality of NetView with extended system, processor and service connectivity and by offering specific services to assist end users in the migration process.

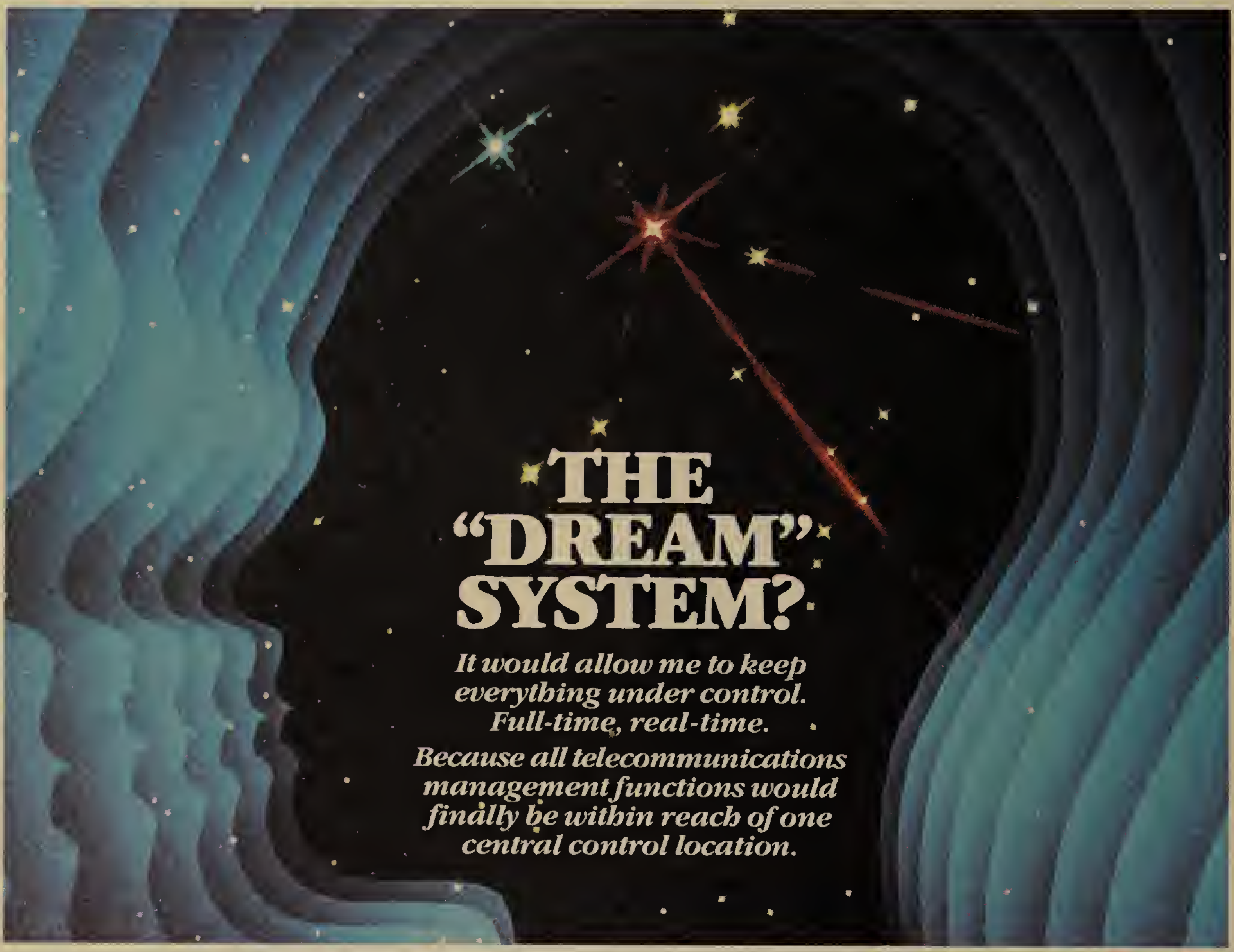
This assistance will most likely take the form of a service package similar to the LAN Implementation Services offered to Token-Ring end users. IBM has bundled these services under the SolutionPacs label for several markets.

To meet its network management goals, IBM must first migrate existing network packages to NetView. To do this, IBM is likely to introduce a specific service to assist end users in this migration. This strategy offers IBM additional revenue, provides applications with the "critical mass" to encourage outside vendors to support NetView and hastens the establishment of NetView as a network standard.

Secondly, the company must evolve NetView into a host-based network operating environment under VM at the host and PC-DOS on the Personal Computer with functionality for full end-to-end network management control. This will require the introduction of more sophisticated monitoring, tariff and routing applications.

The evolution of NetView from its skeletal framework to a fully operational system is not likely to occur until 1990. The speed at which IBM enhances NetView depends significantly on how quickly NetView is absorbed by users. The slower the rate of acceptance, the more pressure IBM will put on users through new product releases.

In the meantime, IBM and third-party developers will have to produce enough applications for users to consider NetView an essential network component. ☐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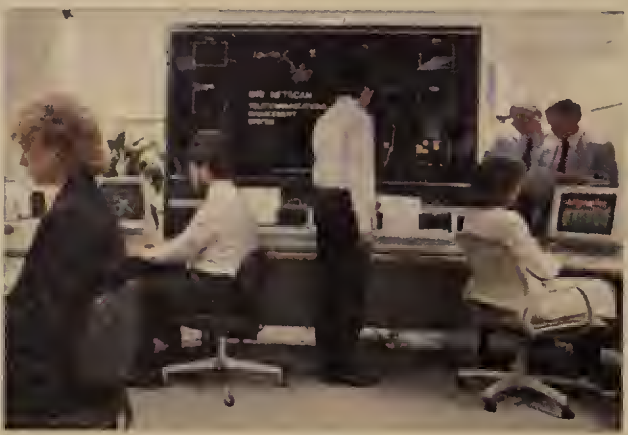

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SPECIAL PULLOUT SECTION
Network Management

Curing WAN madness

Multivendor wide-area network management today is a communications manager's nightmare.

BY HECTOR O. MYERSTON
Special to Network World

If you ask a communications manager about wide-area network management these days, you might just drive him to the brink. Confronted with an insane variety of equipment and services, managers are trying to save their sanity by installing more efficient and cost-effective centralized network surveillance and control systems.

Wide-area network management is no longer the exclusive province of interexchange carriers and large, multinational corporations.

Even in instances where there is no traditional network, as in the case of single-location companies, many users realize that the combination of services provided by the local exchange company (such as foreign exchange and off-premises extensions) and the various interexchange carrier offerings (dial-up, leased-line, WATS and WATS-like services) represent a network that needs managing.

Management breakdown

Wide-area network management functions fall traditionally into three categories. The first comprises traditional analog functions such as hardware monitoring and testing, manual rerouting, transmission-quality testing and traffic monitoring.

Analog techniques and standards are well-defined and consist mostly of "inherited" Bell System practices now adopted by Bell Communications Research, Inc. and the regional Bell holding companies.

Typical of these standards is AT&T Technical Reference 41009, "Transmission parameters affecting voiceband data transmission measuring techniques," May 1975. Since divestiture, users have learned to use these same standards to test and manage their networks.

As a result, they have been able to provide carriers with trouble reports using a common language. One example is the 100 series of tone response tests.

Second is the evolving world of digital services such as Digital Dataphone Service (DDS), T-1, Switched 56 and packet switching.

These digital services will lead, it is hoped, to the much-heralded Integrated Services Digital Network. With digital systems,

Continued on next page

Myerston is supervisor of telecommunications analysis at SRI International, a nonprofit research firm in Menlo Park, Calif.

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users retain most of the old analog testing capabilities and enhance them with capabilities like proactive diagnostics, real-time performance monitoring and automatic rerouting of failed links.

Digital standards within the public network are largely those promulgated by AT&T in such publications as AT&T Pub 54016, "Requirements for Interfacing Digital Terminal Equipment to Services Employing the Extended Superframe Format." However, this area is in some ferment, as various RBHCs are beginning to offer digital services that differ from AT&T's Accunet standard. For example, these RBHC services are less stringent than Accunet and don't necessarily adhere to its synchronization scheme.

Pacific Bell has announced an offering called Digital Data Service with Secondary Channel (DDS-C) and BellSouth Corp. is fielding its version of DDS called SynchroNet. T-1 equipment vendors are offering various forms of "clear channel" capabilities, which overcome the density limitations of the basic T-1 format through ingenious mathematical manipulations of the bit stream. Also, use of subrate (less than the full 64K bit/sec) multiplexing is increasing the number of channels that must be managed.

In the third category of wide-area network management functions, a new requirement is emerging to widen the functionality of the network management system to include associated functions such as private branch exchange call detail recording (CDR), automatic call distributor (ACD) reports, remote alarm monitoring of voice and data equipment and remote control of such facilities and even the network itself.

These services can be provided through the use of out-of-band channels made available through the use of Extended Superframe Format (ESF) in T-1 and the so-called side channels in DDS formats.

In the T-1 networking arena, innovative products not only provide the full set of T-1 and ESF diagnostics, but they can also transmit alarm and diagnostic information from other, dissimilar equipment over derived service channels without interfering with the normal format of other channels. Since this capability is provided outside the normal bandwidth of the "bearer" channels, it is in fact quite similar to the functions of ISDN's D channel and can be the key to successful multivendor network management in this pre-ISDN period.

The digital network, particularly its wide-band backbone, provides not only diagnostic and management information, but also the capacity to transport out-of-band data. Out-of-band data is roughly defined as that alarm, control and monitoring data not directly associated with the operation of the wide-band network. For example, a DS1-based backbone network can provide for the transport of data relating to analog circuits or PBX performance.

Central control

Both analog and digital peripheral equipment vendors are tailoring their equipment to operate efficiently in a network management environment. The trend is for centralized control of the hardware with some form of data collection at the outlying sites. For example, analog trunk test data derived from nightly routine testing of trunks by tone responders can be stored in a data collection device at the remote site. The site is then polled and the data transmitted to the central site.

Alternatively, the site may be polled more frequently and the data transmitted to the central control point as it is gathered.

A similar technology for collecting and centralizing control is being utilized by the majority of the call de-

What's the Score in Distributed Matrix Switching?

	Data Switch	Other
1 Does the vendor offer a true *distributed* matrix switch (versus an electronic patch panel)?	Yes	
2 Is the distributed switch fully operational at the maximum announced matrix size when all satellite switches are attached?	Yes	
3 Are there any documented problems with the control software, resulting in inability to control the switch?	No	
4 Are systems being delivered to customers as promised, or have shipments been delayed?	Yes—on time	
5 How many latest-generation distributed switches have been shipped to customer sites?	200+	
6 Can references be contacted, with sites visited?	Yes	
7 How large is the vendor's in-house service organization?	75	
8 Is local customer service available from vendor's in-house organization?	Yes	
9 Is performance monitoring integrated in the distributed matrix switch?	Yes	
10 How much distance does the switch allow between DTE and DCE?	600′	
11 Does the switch provide V.35 support with no sacrifice in RS-232 ports?	Yes	

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The Data Path Management Company

From previous page

tail recording companies: a data collection device is installed at each PBX location for central collection and processing. Similar systems perform remote PBX traffic studies. Each remote PBX performs its traffic routines on command, and the data is locally recorded and then transmitted to the central control point for analysis.

The need for comprehensive network management is leading to a convergence of the monitoring and control tools associated with all three of the categories described above. But ironically, even though the facilities and technology for effective integrated management either exist today or are under active development, the products currently available don't allow the communications manager to put them all together and make them work.

The black box that collects CDR records is incompatible with the black box that collects traffic data. And the T-1 channel service unit (CSU) or multiplexer that provides transport for the data collected by both boxes may or may not recognize the format of the data. Managing a network in a multivendor environment can be a planner's nightmare because no standard interfaces have been defined.

Vendors take sides

Vendors appear to be divided into two camps, and the interface "standards" that do exist are largely proprietary. The dominant or would-be dominant players — IBM and AT&T — would like to provide the universal solution based on their products. The fact that some of these products have yet to be developed or fielded does not deter them. Their attitude is: "Let the user wait."

IBM's NetView and NetView/PC use standard Systems Network Architecture format. The most controversial feature of NetView is the requirement that data be transferred to an IBM host via LU 6.2 protocols. NetView/PC can perform some functions independently, but the limits of these functions are not yet clearly defined. For example, NetView/PC can retrieve the records from all outlying PBXs and format them, but it cannot process them.

The interface between NetView/PC and non-IBM systems is defined by user and vendor applications, and it requires that specific Application Programming Interface/Communications Services (API/CS) programs be written.

AT&T supports both the Telemetry Asynchronous Block Signaling interface and the Man-Machine-Language (MML) interface described in AT&T Publication 54100. AT&T also promises to open its Universal Operations System (UOS) network operation standards to both users and vendors. Again, how open and when the interfaces will be defined is left unspecified.

Smaller, more innovative vendors would like to market systems that can interface with everyone's products. These vendors are designing interfaces based on the X.25 packet-switching protocol that they hope will be able to make an easy transition to the ISDN Link Access Protocol, D channel standard.

Users strangely silent

The silent party in all this standards brouhaha has been the user. Unless users assert their will, they will end up with a series of competing de facto standards, which is equivalent to having no standards at all.

Large vendors have little incentive to promote standard interfaces: They would rather have users standardize on their products and be locked into using only their equipment. Since NetView/PC has the inherent capability to collect data from the Rolm Corp. PBX and the IBM Token-Ring Network, the communications manager must either select these

Continued on next page

A World of Differences

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From previous page

products or take on the unknown and develop a unique user-written application under API/CS. However, neither alternative is attractive for users.

In limiting themselves to a proprietary version of the network management interface, users risk becoming a captive audience, once again losing control of their networks to the extent that the use of noncompliant systems will limit network control functionality. Soon, users may have to declare large portions of their existing networks obsolete in order to provide up-to-date network control.

Users should refuse to accept this piecemeal approach and instead demand the development of true standards. The mechanisms to develop such interfaces clearly exist, whether internationally (the Consultative Committee on International Telephony and Telegraphy) or domestically (the various T-1 subcommittees). All that is required is for users to demand them. Users can exert their influence both through participation in users groups and by requiring standards compatibility in their requests for proposal.

Hardware alternatives are available. Many vendors, some of them little known, are struggling with this issue. Several vendors have announced products that allow for the gathering of diagnostics, alarms and control signals from dissimilar multiplexers or data collection devices. By standardizing the relatively inexpensive CSU, rather than the T-1 multiplexers themselves, a network of dissimilar gear can be made to appear as a uniform entity. Larse Corp., General DataComm Industries, Inc., Codex Corp., Racal-Milgo, Inc. and Paradyne Corp. have all announced such products at T-1 or lower digital rates.

The coming of the black box

The idea of a common black box to collect data from analog, digital, voice or data equipment is an idea whose time has come. Both Network Control Corp., a maker of analog circuit test equipment in Danbury, Conn., and several CDR manufacturers, including Instor Corp. and TSB International, Inc., are working on such products. Some systems can even do true PBX traffic engineering on a remote basis.

Such systems as Forte, developed by Natel & Co. in Carlsbad, Calif., perform remote traffic engineering by accessing the brains of the PBX to obtain complete call data. NetView uses the less accurate method of examining records of completed calls only.

James Mongiello, Larse's vice-president of sales, says that without standards, the independence of the user and ability to choose the best product will be compromised. Both Sam Brown, the chief executive officer of Network Control, and Don Hagge, president of Instor, a maker of personal computer-based CDR systems, see the ability of the on-site black box to collect data from various sources as key.

Charles Knuff, president of Natel & Co., sees the need to develop unique interfaces for each network management system as a burden both to vendors and users. A single-purpose device, such as a CDR data collector with polling capabilities, today costs as much as $4,000. With personal computer prices coming down, vendors should replace this device with a multiuse personal computer-like device that has increased capacity at a lower cost. Such a device, with a clearly defined standard interface, would make the communications manager's task easier.

What users can do

The pre-ISDN era is one fraught with opportunities and dangers for communications managers. One way to make the job easier is to insist that the industry adopt a uniform network interface. The chaotic conditions developing today cannot be allowed to continue.

Fortunately, since many of the products and services announced so far are only vaporware, there's still time for users to assert themselves by rejecting vendor solutions and demanding the development of standards. Large corporate users carry the most weight here, but smaller users should not dismiss their influence, particularly when asserted through users groups and communications associations.

Users can start by finding out what local users groups exist in their area or by starting their own users groups. Linking up with national users groups helps users establish liaisons with the appropriate CCITT and ANSI subgroups. Although users cannot always vote on these groups, they can influence voting members by sending representatives to group meetings to make their opinions known. Both of these groups will listen to user input.

Users must assert their strength in numbers. Vendors will only provide standards in response to market demand. Users who wait for de facto standards to emerge will have no one to blame but themselves when these standards later prove to be inadequate or confining. ◻

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— *Jennifer Mills*

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Network management in a nutshell

Here's a quick rundown on the hows and whys of network management.

In the few short years since network management has come to the fore, its theory and practice have evolved substantially, fueled by users' increasing sophistication and reliance on networking after divestiture.

Although most users still view network management as diagnostic modems commanded by a microprocessor-based network control center, the concept is often a catchall that embraces everything from handheld protocol testers to IBM mainframe-based software network management tools.

In the broadest terms, network management encompasses any and all equipment used to maintain networks to ensure up time. The ultimate goal of network management is to enable a network operator to use a single workstation to monitor, control and regulate all aspects of a complex voice and data network.

Today, however, voice and data networks are typically managed separately because they are separate disciplines in most companies, and recent network management developments primarily involve data communications.

A noisy line in a voice network may result in blurred speech, whereas the same condition may alter the balance of a data network by requiring a high number of retransmissions.

Data communications network management systems are typically stratified according to the type of equipment they control.

It is not uncommon for large computer shops to use separate systems to manage their modems, multiplexers, matrix switches, packet switches and high-end T-1 multiplexers.

While the network management capabilities available within this diverse range of products vary widely, generally speaking, the tools for each class of equipment fall into two categories: network monitoring and control, and performance measurement.

Early network management systems distinguished monitoring from control functions; but today, most modem management systems bundle control features in with basic monitoring, according to Kathryn Korostoff, a senior market analyst with market research firm International Data Corp., based in Framingham, Mass.

The integrated monitoring/control function of a modem-based system could, for example, audibly or visually alert network operators to problems in the net.

The operators would then diagnose the problems and try to rectify them, either by kicking in standby equipment or by routing traffic around the afflicted portion of the network.

In addition, many systems record the sequence of events and details of problems encountered to facilitate report generation and event analysis.

Performance measurement is generally used in conjunction with network monitoring and control equipment, but Korostoff says it is becoming more difficult to find equipment that provides only one type of function or the other.

Unlike basic network management tools, performance measurement systems enable network operators to gauge things such as response time, for instance, whether a problem stems from a delay at the host or a degraded line condition.

These measurement systems also indicate how network loads affect switch and throughput performance.

Performance monitoring systems can also help users who are in the planning stages calculate how the use of different protocols or network configurations can affect their networks.

One of the greatest shortcomings of network management systems today is the number available. A network operator trying to keep tabs on the complex network outlined above would have to use individual components tied to each type of equipment.

The ultimate goal of network management is to integrate the various pieces into a single system that would enable users to monitor, control and measure the performance of their network from a single terminal.

— *John Dix*

Syndrome from **page 22**

the corporation, we're in constant change.

Administration of the network means tracking the departmental data base, which is simply the representation of the network as a facility. This includes cutting work orders, tracking change notices and making sure vendors deliver and that they bill us correctly.

How do you make sure you get billed correctly?

Edison: We spend a lot of time very carefully reconciling bills. We are highly procedurized for having each order placed, checked and entered into the data base. We periodically scan the data base for overdues, and when the circuit is turned on, we go back to the data base and then OK the payment.

Every year, I save enough from incorrect bills to pay for the whole operation.

Some analog line-test equipment vendors sell the idea that you can save a lot of money by testing circuits often and refusing to pay for them when they don't meet the carrier's line-quality specifications. Is that a realistic thing to do?

Edison: Yes, but the issue of paying for a service you're not getting is secondary to making sure that the network is available. We do routinely test our network using this type of tool.

Going back and using muscle on the vendors is something that we do to impress upon them that they must provide quality.

What we do is systematically go back and demand that they give us relief on the cost of this if we have a situation that is causing us great difficulties. It is more of a tool for insisting on high standards of network quality. The revenues one might save are not particularly large.

What will be the impact of Integrated Services Digital Network on the network management arena?

Frank: You can separate common channel signaling and ISDN and think of them as individual entities. I don't think ISDN will have a major impact in this area for five to seven years. You will not see very much penetration of ISDN into the public telephone networks in the next five years.

When you see it, it will only affect the transmission aspects of network management. It would take the modem management problem away, but you would have to use some other control scheme.

Edison: It is far from clear what ISDN is going to do for end users. We are in the process of developing an ISDN pilot, and perhaps one of the promising things it will support is data communications with our vendors and some financial institutions.

I see benefits only if we allow the Signaling System No. 7 common channel signaling to become part of ISDN. That can take place apart from ISDN. In fact, I could go out tomorrow and hook up a packet-switching network and have the signaling take place separately.

If I waited for the public offering of ISDN and held back our development schedules, I think it would put the corporation I represent at a serious disadvantage. We are moving ahead with ISDN-like schemes in our own operations.

Where we have the need for combining voice and data — for example, in our local-area networks — we are just going ahead and doing it. We can't wait for these issues to be thrashed out in public. ◻

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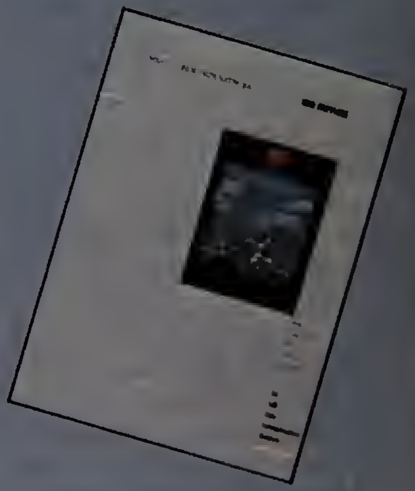

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>
> **Mike O'Brien**
> Director
> Telecommunications product management
> IBM Information Systems Group

NETWORKING SOLUTIONS

NetWare boosts synergy

BY MARY PETROSKY
West Coast Correspondent

What happens when the local-area network you buy doesn't work?

A number of local network pioneers have been able to switch to a new network type and still salvage some of their original hardware investment by using Novell, Inc.'s NetWare as the common denominator.

Litton Aero Products, a division of Litton Systems, Inc. in Moor Park, Calif., is typical of network sites using NetWare as a constant across a variety of network hardware. Litton purchased an IBM PC Network soon after the product was introduced in 1984. “We never were successful in getting that system to work,” said George Sinks, director of information services. After several months, Sinks dismantled the five-node network.

Last summer, Sinks discovered that Novell's network operating software was compatible with the IBM PC Network, so he brought the PC Network out of the closet and soon had it up and running with NetWare. When it came time to expand, however, Sinks opted to install Novell's S-Net, instead of expanding the PC Network.

Sinks' decision was based on the recommendation of a local network dealer and the belief that the S-Net's Motorola, Inc. 68000-based server would provide consistently good performance. Over time, however, S-Net's maintenance problems made Sinks less enthusiastic. “I don't have the technical expertise to support S-Net,” Sinks said.

For one thing, the network's star topology meant that a server failure would require each node to be reconnected to a substitute server. He said his staff is more familiar with personal computers based on the Intel 80286. Therefore, they can service this type of network server more easily than the S-Net server.

Sinks later decided to implement an Ethernet network within his own department, which he linked with the S-Net using an IBM Personal Computer AT clone set up as a gateway with interface cards from each network. “We have not had any problems with people crossing over topologies,” Sinks said.

However, problems have arisen with Novell's NetWare SNA Gateway, software used to link NetWare local nets to IBM hosts. The current gateway software limits the size of records that can be downloaded, Sinks said. In addition, users with color monitors who try to toggle between host sessions and network sessions end up with garbage on their screens, and they must reboot.

These problems are supposed to be ironed out in the next revision of the software, but another prob-

See **NetWare** page 34

LANMARKS

PAULA MUSICH

New breed of managers reigns over work groups

The computing novices and part-time hobbyists who have volunteered to look after work group local networks are slowly being replaced by a new breed of network managers drawn from data processing, MIS or information center professionals.

These managers are bringing a more global perspective to the task of managing local networks, and they are taking on a new set of responsibilities affecting a larger number of users.

Unlike their predecessors, these managers need to look beyond the networking needs of a single department. Indeed, many are beginning to explore ways of integrating existing and often incompatible networks from different departments into a communications backbone serving an entire organization.

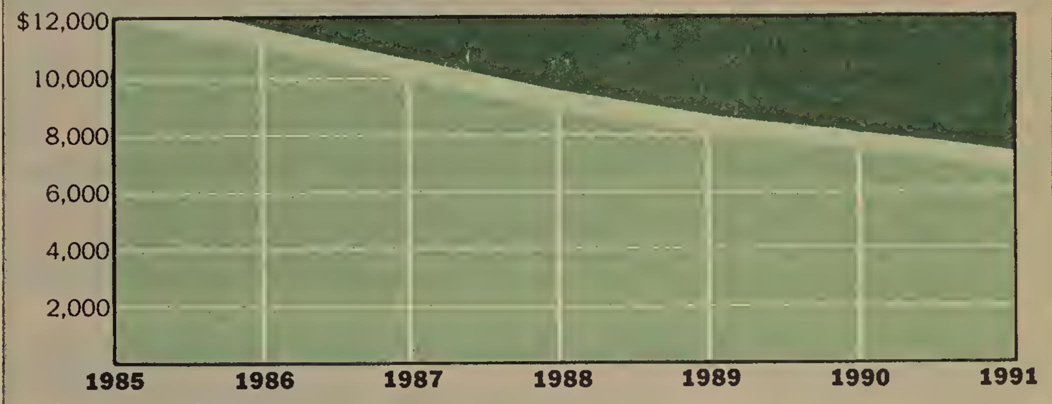
They also differ from those who came before them in that they understand the requirements of managing shared data. “With stand-alone personal computers, each user was responsible for his own data,” observed Frederick Geinosky, an MIS professional responsible for a 20-node network at Allstate Insurance Co. “If they screwed up, it only affected one person. Now that they're working on the network, it's like going back to the mainframe environment, where their mistakes can affect a lot of users.”

Many firms' early personal computer network users considered the network as another personal computer peripheral, one not much different from a graphics adapter. They learned the hard way that managing the network requires more than just part-time attention from administrative support personnel.

According to David Ferris, president of the San Francisco-based Ferrin Corp., which installs personal computer networks, system administration requires some programming skills and the ability to install software. “It can't be done effectively by users,” he said at a recent seminar on personal computer networks.

While professionals such as Geinosky have no illusions that supporting a network of personal computers is a nontrivial task, even they sometimes underestimate the system management requirements of a network. They have the know-how, however, to size up the job and calculate what has to be done to execute the task. ◘

Projected costs for personal computer network servers 1985-1991



SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

MULTIVENDOR NETS

IBM embraces TCP/IP

Offers link for hosts, LANs and PCs.

BY PAULA MUSICH
Senior Editor

IBM recently reaffirmed its pledge to open up its systems and coexist in multivendor environments with the addition of a TCP/IP-based gateway for IBM hosts, Personal Computers and local networks.

The LAN Channel Station gateway device can be channel-attached to VM-based, System/370 architecture processors. The gateway supports up to four network adapter boards for connection to Ethernet nets and IBM's Token-Ring Network and PC Network.

When the LAN Channel Station device is used with the IBM Transmission Control Protocol/Internet Protocol for VM programs and TCP/IP for PC DOS software, this combination enables users within an IBM realm to communicate with machines from other vendors.

The gateway supports TCP/IP software to transfer files, exchange electronic mail messages and perform remote logon functions with the IBM Personal Computers and System/370 hosts.

“One of the major customer requirements that we are working on is multivendor connectivity,” said Mike O'Brien, director of telecommunications product management. “Customers in defense and education are asking us for this because they already have investments in TCP/IP networks.” O'Brien said TCP/IP is used extensively in engineering and computer science departments in universities.

“SNA wasn't acceptable to the engineering environment because network connections are controlled by the data center manager instead of users,” according to Dan Lynch,

See **IBM** page 34

IBM unveils link

continued from page 33

president of Advanced Computing Environments, a standards consulting firm. "With TCP, people connect to the network when they want to, not according to the schedule of some other department."

Support of TCP/IP protocols is also a capability requested by Share, the large IBM users group.

"If someone wants to purchase an IBM total system — the host, channel station and our LANs and PCs — and the requirement is to interconnect to an installed network and exchange information and files, this gives them the capability to do that," according to Maurie Prauner, IBM manager of product marketing for local area networks.

According to Lynch, the TCP/IP for VM program also provides a link to IBM's PROFS office automation system, allowing PROFS users to exchange simple electronic messages with users on TCP/IP mail systems.

The gateway and software will initially be marketed through IBM's Academic Information Systems business unit based in Milford, Conn.

O'Brien would not say how far IBM plans to go with its support of TCP/IP. "The only direction we're trying to follow is to provide multivendor connectivity where it's required. Our strategy is still SNA and Token-Ring, but we'll be there for OSI."

The products will be available in the fourth quarter of this year. The Channel Station Model 001 with one channel connection and two local network connections is priced at $31,000. Model 002 with two channel and four local network connections is priced at $47,700.

TCP/IP for VM will have a one-time charge of between $4,000 to $16,000, depending on the processor group. It will also have a monthly license fee of $335.

The one-time charge for TCP/IP software for the personal computer, which must run in each personal computer on the network, will range from $2,400 to $13,500. ▣

NetWare boosts synergy

continued from page 33

lem has eluded resolution: Occasionally, users trying to log on to the host have to make repeated attempts.

Today, Sinks' S-Net network has 30 users and one server. The Ethernet network has 20 users and will soon have a second server. Sinks said he believes the two networks could grow to support as many as 180 users by mid-1988.

Over the next few months, Sinks also said he expects to install Digital Equipment Corp.'s DECnet. DEC has told Sinks that by August, it will have software capable of communicating between DECnet and NetWare. Novell has promised Sinks this same capability.

In-Circuit Test, Inc. of Milpitas, Calif., also made its first foray into networking with the IBM PC Network. Kathy Casey, programming services manager, said she struggled with the IBM hardware and software for four months. "It doesn't work well at all," Casey said. Although Casey said the IBM PC Network interface cards are unreliable, their $700-plus price tag made her reluctant to discard the four cards she was using.

Instead, she bought NetWare and has expanded the network using ARCnet interface cards. The network now supports six nodes and will likely grow to 10 nodes. The main problem Casey has encountered is that users on the IBM PC Network nodes cannot get onto the network if they do not log on within 20 minutes of the time the server is turned on. If these users miss their timing window, the whole network must be brought down and rebooted.

Boston-based MediVision, Inc. also had a bad first experience with networking. More than two years ago, Bill Nickel, a systems analyst, was confronted with an Ungermann-Bass, Inc. network that was crashing daily. Unable to resolve the problem, MediVision decided to replace the network, Nickel said.

3Com Corp.'s Ethernet network was chosen since it allowed the company to reuse the coaxial cable from the Ungermann-Bass NetOne network, according to Nickel. He chose NetWare based on generally positive comments he had heard about it. A year ago, MediVision put in a second network, this time Novell's S-Net. Several months later, Nickel installed a bridge between the two networks, which are on separate floors.

"We've had a lot of problems with the bridge," Nickel said. When users on the S-Net network try to log on to the server on their floor, they are kicked downstairs to the server on the floor below. "We really can't use the bridge at this point, and Novell is not clear on what the problem is," he said.

Despite their respective problems, these network users now have the benefits of increased overall performance and usability. NetWare has also brought another benefit, networks that work. ▣

As networking takes over the world, Network World takes over the market.

NETWORK WORLD
MCI charting new packet net course
AT&T renovates low-end strategy
Hopeful users face Token-Ring limits

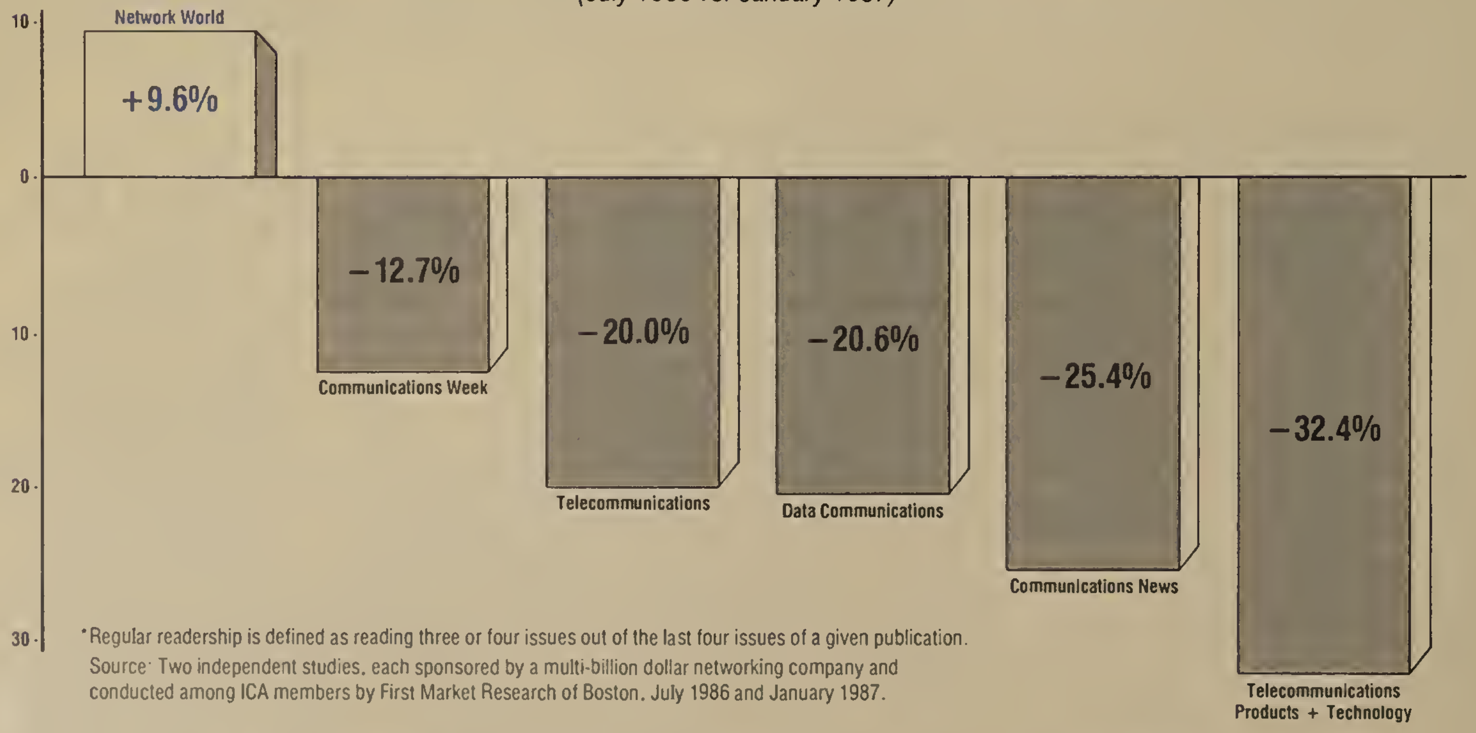
The trend has never been clearer. Networking is now the major application market for communications. And a recent statement by Ken Olsen, President and Founder of Digital Equipment Corporation, substantiates this trend: "We have to start thinking of the computers as peripherals. You start with the network, then you hang the computers on later."

Networking. It's been *Network World's* focus from the very start. In fact, it is the *only* publication that covers the entire realm of communications from the networking point of view. And in doing so, *Network World* has established itself as the *standard* for communications users already networked or planning to network.

Today's users know they need up-to-date information in order to keep pace with the evolving world of networking. That's why they read *Network World*. And that's why *Network World* was the only publication to gain in regular readership in an independent study conducted among ICA (International Communications Association) members, some of the nation's most influential buying decision-makers for voice and data communications products and services.

The study, sponsored by a multi-billion dollar networking company and conducted in January 1987 by First Market Research of Boston, showed decreased readership of all communications oriented publications among ICA members since a previous study in July 1986. Only *Network World*, with its exclusive networking-oriented coverage, experienced an increase in regular readership. The percentage increase/decrease for each publication over that six-month period is displayed in the following chart.

Percentage Change in Regular Readership* among ICA Members
(July 1986 vs. January 1987)



*Regular readership is defined as reading three or four issues out of the last four issues of a given publication.
Source: Two independent studies, each sponsored by a multi-billion dollar networking company and conducted among ICA members by First Market Research of Boston, July 1986 and January 1987.

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COMMUNICATIONS MANAGER

> “The perception of the DP/MIS manager as a technologically dedicated keeper of only the host data center is no longer current. Today's chief information officer is in a position to enhance the importance and contribution of the information systems organization by keeping the company in a sound, competitive position.
>
> **Fred Golove**
> Program manager with IBM's corporate information systems strategy department
> As quoted in “IBM Bulletin”

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SOURCE: NORTHERN TELECOM, INC., NATIONAL SL-1 USERS GROUP CONFERENCE, CHICAGO, ILL.

ASSOCIATIONS

The Southeastern Telecommunications Association (SETA) has landed Ellen Hancock, vice-president of IBM and president of IBM's Communication Products Division, as keynote speaker for its 1987 conference.

The conference, scheduled for Nov. 16 through Nov. 18, will be held at the Marriott World Center in Orlando, Fla. The theme of the conference is “Telecommunications: A Strategic Resource.”

The early registration fee, for applications postmarked by Oct. 26, is $275 for SETA members and $325 for nonmembers. Late registration is $325 for members and $375 for nonmembers. For more information, call (804) 746-3195.

The National Rolm Users Group (NRUG) held its Interim Resolutions Conference in Chicago on April 23 and 24. During committee sessions at the interim meeting, NRUG members drafted so-called resolutions — which involve issues of concern to users of Rolm Corp. products — that were presented to Rolm for response.

Rolm is expected to deliver its responses to the resolutions at NRUG's annual conference, which will be held in Santa Clara, Calif., Oct. 7 through 9.

Some 200 NRUG member organizations developed 45 resolutions that were given to Rolm representatives in attendance. According to NRUG members, resolutions involved automatic call distribution products, maintenance and phonemail, as well as data communications, networking and switching

See **Associations** page 36

LATA STRATEGIES

Massachusetts turning to T-1

State seeks savings with hub network.

BY BOB HAMEL
Senior Editor

BOSTON — James Corum, director of the Massachusetts Office of Management Information Services (OMIS), is hoping to cash in on a T-1 hub network that he and other communications managers are investigating as a way to cut the escalating cost of private-line services that cross LATA boundaries.

Using T-1 facilities to link hubs in the state's Eastern and Western local access and transport areas, instead of individual inter-LATA private lines, could save the state $10,000 per month, Corum said.

If a pilot program that is under way confirms Corum's prediction, by September, the Commonwealth of Massachusetts' State Lottery agency, the 37 branch offices of the Registry of Motor Vehicles, the state's Criminal History Systems Board and other state networks could be using T-1 facilities.

With the pilot program, the state is testing a T-1 facility that links a hub in Springfield, Mass., in the Western LATA to a Boston hub in the Eastern LATA.

The T-1 facility has already allowed Corum's office to provide data transmission services at 4.8K and 9.6K bit/sec for about half the previous cost.

If the pilot program proves successful, additional T-1 facilities will be installed between Boston and Worcester, Mass., and a redundant system will be installed.

The decision to test T-1 facilities came about as a result of the AT&T divestiture, which established LATAs to distinguish between local and long-distance service, Corum said. The need to use inter-LATA circuits to communicate between the Western and Eastern halves of the state for essential data base networks was running up a hefty communications tab for OMIS.

The average cost for each inter-LATA private-line circuit is approximately $770 per month, Corum noted. The cost of T-1 links between Springfield and Boston run about $370 per circuit per month. The state uses roughly 85 inter-LATA circuits in its major data networks.

“With divestiture, it made sense to do our networking slightly differently,” Corum said. “One of the recommendations was to put in a hub T-1 network between Boston, Worcester and Springfield, and so we started that on a pilot basis.”

OMIS' network manager purchased T-1 multiplexer equipment from Paradyne Corp. and installed it in the Springfield state office building and OMIS Boston offices in early February. The circuits are now being moved onto the T-1 facility.

In addition to managing its own 4,000-device, statewide network,

See **T-1** page 36

GUIDELINES

ERIC SCHMALL

Dealing with the self-ordained expert

As George Burns said, “It's too bad that the people who really know how to run the country are too busy driving taxis and cutting hair.”

That comment also applies to the communications field, where managers will encounter senior management in the decision-making hierarchy who are “experts” on telecommunications issues. It's a shame they're too busy directing their departments to guide the communications function.

And so the issue forms: How does one handle the self-ordained expert?

In the halcyon days of telecommunications management, or predivestiture, these experts appeared as a handful of Heathkit aficionados who would occasionally stop the communications manager in the halls to schmooze about the differences between ground and loop start.

Since 1984, however, the public has been forced to become more technically literate. This demystification of the discipline came about naturally as people began installing their own home phones, communicating with their personal computer modems and choosing among competing common carriers for their families' long-distance toll needs.

Now, the telecommunications professional will be confronted at some time in his career with a unique challenge: A nontechnical senior decision-maker will demand greater explanation of the communications department's proposals, recommendations or policies.

This has to be examined in light of the person issuing the challenge. There are two types. One is the senior staffer who really does understand and recognize the major issues and technologies involved. The other doesn't know a multiplexer from a Masonic handshake. Telecommunications managers ultimately must work with both.

Dealing with a decision-maker who has a firm grip on the issues through his own self-education is bound to make the communications manager's life more difficult — and ultimately more rewarding.

Because of this senior level interest, the manager and his staff will have to work more diligently to prove their research, analysis and conclusions are unassailable.

The rigorous demands of a reviewing authority who considers both the business and technical aspects should produce high-quality recommendations. While the communications manager may not leap at this opportunity, he should at least recognize the potential benefits to the organization.

A much grimmer experience awaits the manager who has to deal with the decision-maker who sees himself as the futurist and author James Martin, but whom others see as Steve Martin.

The same rigor and diligence will be required for the same reasons. In this scenario, the communications department not only has to prove itself, it also

See **Expert** page 36

Schmall is network systems manager for an insurance holding company.

Associations from **page 35**

products.

NRUG last week held its annual business meeting in conjunction with the 40th Annual Conference and Exposition of the International Communications Association in New Orleans. In addition to the election of officers, the group heard a keynote address by newly appointed Rolm President Ray AbuZayyad. For more information, contact NRUG at (408) 986-2676.

The Midwestern Telecommunications Association (MTA) is inviting users to submit narratives, essays or case studies on issues involving telecommunications and telecommunications management.

The winning paper selected by MTA will be published in *Business Communications Review*, and the author will receive $1,000 and free registration to the 10th Annual Midwestern Telecommunications Conference, which will be held Oct. 11 through 15 at the Chicago Hilton and Towers. There will also be prizes for second-place and third-place papers.

For more information, contact MTA at (312) 963-3520. ☑

Mass. turning to T-1

continued from page 35

OMIS provides networking and planning assistance to Massachusetts' numerous data centers, including the state's department of revenue, the department of corrections, the division of employment security and the executive office of environmental affairs.

OMIS has already converted 10 circuits from inter-LATA service to T-1 to serve seven state agencies. The departments of mental health, welfare and public health, the office of the district attorney, the Massachusetts Rehabilitation Commission, the University of Massachusetts and the Department of Social Services have volunteered to use the T-1 facilities.

OMIS is considering installing redundant T-1 facilities and running between 40 and 45 circuits per facility among the Worcester, Springfield and Boston sites.

"With two systems, there are some nice savings," Corum said.

Although one system could handle all 85 circuits, Corum said he would prefer using two T-1 links. "These networks are supporting some critical on-line applications, so we can't take the risk of running everything on just one system," he said.

"Our planners and researchers indicate that the break-even point on the system is getting 18 circuits onto the T-1 facilities," Corum said. "We're shooting for at least 50."

The department estimates it will be saving $122,000 annually if 50 of the 85 circuits are migrated to the T-1 link. But Corum said he does not expect every agency to go along because switching to the new network is voluntary.

"Some of these data centers fall under a different jurisdiction [other than OMIS], so they might not go along," he said.

As a strong inducement, Corum shows the agencies the potential savings of using T-1. "That usually gets their attention," he said. ☑

Dealing with the expert

continued from page 35

has to educate this party subtly, politely and discreetly.

When the self-anointed manager mixes up broadband and baseband, analog and digital or when he utters some other howler in his critical comments, the prudent communications manager will find a method to clear up the confusion privately.

At the same time, the true professional will reserve the possibility that the interested senior staffer — while maybe not the guru he believes himself to be — can challenge the department to perform at its best. ☑

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Unisys boosts interface

Allows FEP to share cabling plant with other vendors.

BY PAULA MUSICH
Senior Editor

Mainframe computer maker Unisys Corp., the merged Sperry Corp. and Burroughs Corp. company, recently enhanced its Burroughs mainframe Ethernet interface to be totally compatible with the IEEE 802.3 standard, *Network World* has learned.

The Ethernet interface, dubbed CP LAN, is an adapter for Unisys' CP2000 communications front-end processor for the company's A Series hosts. The enhanced interface will allow the Burroughs communications processor to share the same cabling plant with other vendors, barring any addressing overlap.

Communications software that runs on top of the interface is based on the Burroughs Network Architecture.

"Complete Ethernet compatibility gives us the ability to develop gateways to other Ethernet networks running different communications protocols, such as TCP/IP," said Jim Babcock, vice-president program general manager for communications and networks with Unisys.

Within the federal market, Burroughs already announced a Transmisson Control Protocol/Internet Protocol product that operates over the Defense Data Network, according to Babcock.

"It is [Unisys'] intention to provide TCP/IP products in the commercial environment over a given course of time."

"It is our intention to provide TCP/IP products in the commercial environment over a given course of time. We have to test TCP/IP over Ethernet and X.25 before that happens," he said.

Unisys is also considering developing an outboard Ethernet interface that would allow bridging to still other Ethernets, according to Allen Gough, program manager for communications products. The decision will be based on market demand for such a link.

The price of the interface, which is already available, may be incrementally increased over the cost of the existing interface, although that has not yet been determined.

Earlier this year, Unisys also announced an 802.3-compatible Ethernet interface for the Burroughs B25 family of universal workstations. The workstations are IBM-compatible and use the Intel Corp. 80186, 80286 and 80386 microprocessors.

▶ *MULTIPLEXERS*

Case digital mux out

Modems for IBM PCs also bow.

BY JIM BROWN
New Products Editor

COLUMBIA, Md. — Case Communications, Inc. recently introduced a digital T-1 multiplexer capable of supporting up to 16 T-1 lines in either point-to-point or multipoint networking environments.

The firm's 7450 Digital Network Processor (DNP) is compatible with AT&T's Digital Access Crossconnect Service (DACS), which enables channels within a T-1 pipe to be routed individually from an AT&T switching office. The product also supports subrate and superrate digital multiplexing.

According to Case, the new 7450 DNP's subrate multiplexing will accept incoming lines that support individual channels operating at between 2,400 and 56K bit/sec, while its superrate multiplexing will support individual channels operating at 56K-, 64K- or 1.544M bit/sec, the T-1 speed.

Each 7450 DNP will accommodate up to 16 incoming T-1 lines that support a total of up to 240 asynchronous data channels, 240 synchronous data channels and 96 voice channels. The 7450 DNP also features net management controls that allow a manager to configure a network of 7450 DNPs from a central site. These controls also allow the manager to run diagnostic tests as well as monitor local and remote system alarms from any 7450 DNP in the network.

In addition, the 7450 DNP will support redundant components including T-1 line cards. The spare components enable managers to configure the system to switch over to backup services when the main component fails. In multinode networks, the network manager can also establish alternate routing if one of the units goes off line.

Pricing for the 7450 begins at $12,000 and depends on configuration.

Case also released three board-based modems for IBM Personal Computers and compatibles. Each of the modems supports Microcom, Inc.'s Microcom Network Protocol (MNP) error-checking scheme. They also support the CCITT V.22bis standard and will communicate with modems supporting Bell 103 and Bell 212A standards. In addition, each will operate asynchronously over leased or dial-up lines in either full- or half-duplex mode and are compatible with Hayes Microcomputer Products, Inc.'s AT command set.

Priced at $699, the 4624/PC operates at up to 2,400 bit/sec, while the $799 4648/PC operates at up to 4.8K bit/sec, and the $1,749 4696/PC operates at up to 19.2K bit/sec. The 4696/PC employs MNP Class 6 protocols, which permit it to adjust automatically to the maximum speed of the other modem.

Case Communications is located at 7200 Riverwood Drive, Columbia, Md. 21046, or call (301) 290-7710.

▶ *CHIPCOM*

Broadband modem lets users save bandwidth

BY JIM BROWN
New Products Editor

WALTHAM, Mass. — Chipcom Corp. recently introduced a combined transceiver and broadband modem that can be used to establish a 10M bit/sec Ethernet network on a broadband network using a single 12-MHz channel.

The firm's Ethermodem III/12 uses less broadband bandwidth than the earlier Ethermodem models introduced in late 1985. Those earlier models comply with an IEEE 802.3 subcommittee standard calling for Ethernet networks to use an 18-MHz channel when running over broadband cable.

Chipcom said users of the new Ethermodem III/12 may want to trade off compliance with the 18-MHz channel IEEE specification in order to preserve capacity on broadband networks, which typically have a 400-MHz bandwidth.

Preserved bandwidth could be allocated to other broadband network applications such as video transmissions, Manufacturing Automation Protocol networks, building security and energy management systems.

The new Ethermodem III/12 comes with two or eight ports and allows Ethernet Version 2.0 or IEEE 802.3-compliant local-area networks to connect into a broadband network.

The device will support transmission between nodes that are located distances of 4,700 ft apart.

A remodulator included with the unit will perform the required signal translation that allows two broadband Ethernet networks to operate concurrently on a MAP broadband cable. The remodulator takes traffic sent from one Ethernet node at one frequency and transmits it to another Ethernet node at another frequency.

According to Chipcom, the link-level Ethermodem III/12 functions independently of the higher level network software running on the Ethernet, such as Digital Equipment Corp.'s DECnet, Transmission Control Protocol/Internet Protocol, Technical and Office Protocol as well as Xerox Corp.'s Xerox Network Systems protocol.

The new product is now being installed at beta test sites and is scheduled for shipment this fall. The eight-port Ethermodem III/12 is listed at $6,350, and the two-port version is priced at $5,250.

Chipcom is located at 195 Bear Hill Road, Waltham, Mass. 02154, or call (617) 890-6844.

First Look

Dial backup systems bow

Dataprobe, Inc. introduced a unit that switches failed 56K bit/sec circuits to the switched telephone network and a dial backup system supporting 48 leased lines.

The microprocessor-based **K-56** system switches failed dedicated 56K bit/sec AT&T Dataphone Digital Service (DDS) lines over to AT&T's Switched 56 service, a dial-up DDS offering.

Requiring units at either end of the link, the K-56 performs a security verification check to avoid unauthorized access to terminal equipment over the switched network before allowing data to flow over the switched circuit.

The K-56 units at each end of the circuit automatically return to the dedicated 56K bit/sec line when the switched 56K bit/sec link is terminated. The K-56 supports V.35, RS-449 or RS-232 interfaces. The data path, link status and code verification are displayed through front-panel LEDs.

The **AUTO-NET Network Restoral System** consists of a Central Control Unit (CCU) located at a network control center and a series of Remote Control Units (RCU) located at remote sites.

The CCU receives leased-line quality reports from up to 48 RCUs, and when a line degrades or fails, it will automatically dial up to two stored numbers and establish a four-wire path dial-up connection.

The system is also capable of switching over to spare modems at each end of a failed connection. The device continuously tests the leased-line circuit and will reestablish the leased-line connection when line quality is restored.

The CCU can be configured from an attached ASCII terminal, which can also display the status of each circuit in the system. An alarm printer port notifies network control personnel when any changes have occurred.

A pair of K-56s costs $1,250.

Pricing for the AUTO-NET system starts at $1,350 per circuit.

Dataprobe, Inc., 110 West Palisades Boulevard, Palisades Park N.J. 07650 (201) 947-9500.

Repeater for AppleTalk networks

Lutzky-Baird Associates (LBA) announced a repeater that extends the overall distance of Apple Computer, Inc.'s AppleTalk local-area network.

The **LBA Repeater Box** amplifies data signals between segments of an AppleTalk network. According to the firm, an AppleTalk local-area network will link up to 32 Apple Macintosh personal computers over a distance of 1,500 ft, with the maximum distance between Macintoshes set at about 50 ft.

The company claims that one LBA Repeater Box doubles the overall distance of an AppleTalk to 3,000 ft, as well as doubling the distance between any two Macintoshes to 100 ft.

A maximum of four LBA repeater boxes can be attached to the AppleTalk network, thus extending the overall distance covered to 7,500 ft.

The LBA Repeater Box comes with two AppleTalk cables and costs $249.

Lutzky-Baird Associates, 23801 Calabasas Road, #2011, Calabasas, Calif. 91302 (818) 347-7791.

Burroughs system twisted-pair patch panel

Cable Management Systems, Inc. unveiled a data communications patch panel for Unisys Corp. and Burroughs Corp. computers.

The **DPP-Star-1512** patch panel allows Burroughs hosts and peripheral devices to connect in a star topology using twisted-pair wire, rather than the traditional daisy-chain RS-232 connections. Using RJ-11 jacks, the patch panel connects 60 peripherals to 12 host ports. It can be used in conjunction with the firm's standard patch panel or as a stand-alone unit.

The DPP-Star-1512 patch panel is priced at $525.

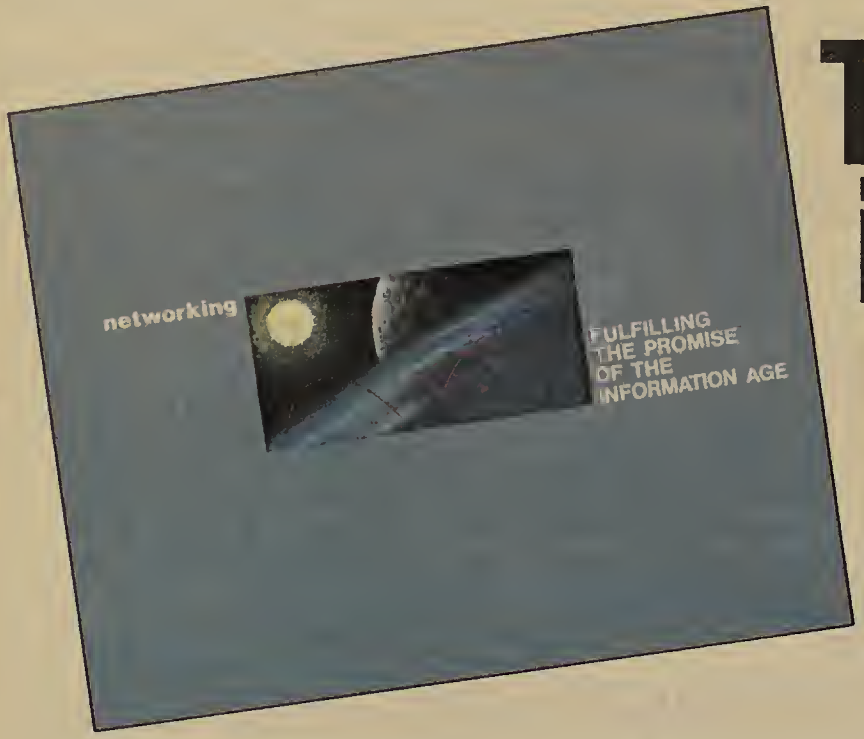
Cable Management Systems, Inc., Suite F, 17955 Skypark Circle, Irvine, Calif. 92714 (714) 261-2622.

Name-calling package released

Octel Communications Corp. released software that allows users linked to its Aspen voice processing systems to dial corporate phone numbers by using the telephone keypad to spell the names of the people they are trying to reach.

The **Dial-by-Name Automated Attendant** eliminates the need for either the caller or an operator to know the extensions of people being called. Callers can reach the program and use the letters on the phone keypad to spell the names of the people they are calling.

Octel also released software



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Just send in the coupon below or call Mary Fanning at 617-879-0700. Your *Network World* sales representative can also supply you with both items. If you're in the computer/communications marketplace, we think you'll find them among the most important things you read this year.

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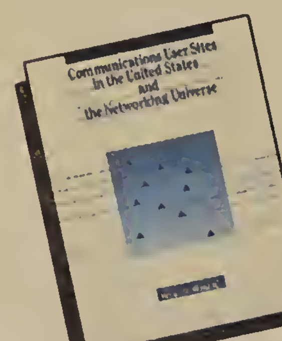

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called **Address-by-Name** that lets Aspen users address voice messages to the mailboxes of other subscribers by spelling the users' names. This eliminates the need to memorize voice mailbox numbers.

Software enabling the integration of Aspen with the Harris Corp. 20/20 and Fujitsu Business Communications 960 private branch exchanges also debuted.

The new functions are part of Octel's Release 7 System software, being shipped with all-new Aspen voice processing systems. An upgrade adding the new features to existing Aspens is priced at less than $6,000 depending on configuration. *Octel Communications Corp., 890 Tasman Drive, Milpitas, Calif. 95035 (408) 942-6500.*

INI releases MAP offerings

Industrial Networks, Inc. (INI) introduced an RS-232 serial interface that connects up to eight factory floor devices to an IEEE 802.4 token-bus network at up to 19.2K bit/sec. INI also introduced carrier-band versions of its MAP/One interfaces and a device that links carrier-band to broadband nets.

The **MIU-20 Serial RS-232 MAP/One Interface Unit** is designed to connect factory floor equipment such as asynchronous terminals, printers, programmable-logic and numerical controllers, and other RS-232-based devices to a Manufacturing Automation Protocol-based network. The unit will allow asynchronous terminals located on the factory floor to access data and applications residing on hosts in office areas, for example.

According to INI, the MIU-20 has a virtual circuit capability that allows factory floor terminal users to switch connections between host computer ports and applications. It will also allow some of the virtual circuits to become permanent connections in order to support communications between programmable controllers over the MAP network.

Operating over the same channels as other INI MAP/One interfaces, the tool can also be controlled from a central-site network management console. The network administrator can modify settings for one MIU-20 port without disrupting the operation of others.

The new carrier-band versions of MAP/One interfaces are board-based products that connect devices to the single-channel 5M bit/sec carrier-band network. Carrier-band networks often serve as subnetworks to a much broader broadband-based MAP network.

The new interfaces include the **MV-400,** which supports VMEbus devices; the **MM-400,** which supports Multibus systems; the **MG-400,** which supports RS-422 devices; the **MP-400** and **MP-500,** which support IBM Personal Computers or IBM Industrial Computers; and the **MQ-400,** which supports Digital Equipment Corp.'s MicroVAX II and other Q-bus systems.

The **MBR-40 MAP Bridge** links carrier-band networks into larger broadband nets. It passes data between a carrier-band and broadband network at 500K bit/sec.

INI also expanded its host-resident MAP/One applications services software to include support for the multitasking Xenix operating system. The new software works with Xenix System 5, Version 2.1, running on an IBM Personal Computer AT using INI's MP-400 MAP/One interface unit for the personal computer bus. It provides a programming interface between user applications and the seven layers of MAP residing on INI's network interface products.

An MIU-20 supporting a carrier-band MAP network is priced at $3,950, while a version for broadband costs $4,950. The carrier-band interfaces range in price from $2,450 to $3,000, while the MBR-40 MAP Bridge is priced under $16,000. The new software is priced under $3,500.

Industrial Networks, Inc., 3900 Freedom Circle, Santa Clara, Calif. 95052 (408) 496-0969.

Package analyzes LAN data packets

3Com Corp. announced a software utility for IBM Personal Computers that allows local-area network troubleshooters and software developers to identify network application coding problems and perform network tuning.

Dubbed **EtherProbe,** the utility runs on an IBM Personal Computer or compatible with 640K bytes of random-access memory and a 3Com EtherLink Plus adapter board.

EtherProbe monitors and displays data packets from local-area networks conforming to Ethernet, Xerox Corp.'s Xerox Network Systems and Microsoft Corp.'s Redirector Server Message Block standards. EtherProbe filters the data packets by source or destination address, socket number or unique bit pattern.

3Com has priced the product at $995.

3Com Corp., 1365 Shorebird Way, Mountain View, Calif. 94043 (415) 961-9602. ☑

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TECHNOLOGY DECISIONS

DAVID RAPPAPORT AND CORY VAN WOLVELAERE

Stay off the roller coaster

Chances are good that in the last several months you've either attended a major communications conference or received a briefing on a new networking product. Through these promotional events, manufacturers tout their products as providing the answer to all your networking needs.

Some announcements may have left you quite excited, feeling you had found the solution to all your networking prayers. It's good to get excited about new opportunities, but don't get caught thinking that a new product, service or architecture will solve all your connectivity problems. That won't come for many years, if ever.

We in the communications industry can be sure of two things. Vendors are developing new products with increasing frequency and each product will be faster, cheaper and better than what is currently available.

The fact is that almost every communications product will be rendered obsolete by yet another new announcement. Always thinking that the latest vendor offering is the solution will only put you on a technology roller coaster, always seeking the perfect answer to your networking requirements.

Telecommunications professionals must take advantage of the benefits of technology. However, we must look at these "revolutionary" new announcements with the skeptical eye of a businessperson. We must examine each announcement on its functional merits by asking what business problem the technology solves, rather than what technical problem it fixes.

An Arthur Andersen client was recently thinking of replacing his telephone system with a newer advanced-feature private branch exchange. When asked about the business basis for the change, the main reasons given were additional capacity and the desire to provide "advanced functionality to the users."

Even though the current system was relatively old (7 years), it was easily expanded with components available on the resale market. Moreover, the functionality the new system could provide was not needed or wanted by users. In the end, the client decided to retain his existing system.

The point is that we must differentiate between the technical and functional lives of communications systems. If something fulfills the needs of the business, don't change it just because something smaller, faster or even cheaper becomes available. To do so is to step onto the technology roller coaster.

The way to stay off the roller coaster is to embrace a "just enough" approach when applying new telecommunications technology. One of the responsibilities of telecommunications professionals is to minimize the company's risk when investing in new technology. Ask yourself if all the communications technology incorporated in your design is necessary to enable you to do business. If you find yourself purchasing more facilities than you need to solve the business problem, chances are that you are about to start the roller coaster ride.

A key indicator of being on the roller coaster is a constant desire to be the first to implement a new technology. Most businesses should not be the first to do so. Granted, special situations arise, such as with competitive advantage networks, in which there's a need to be the pioneer. However, being the second, third or even 10th to implement a new technology is usually fine. By waiting until the technology has been proven, you let others pay the piloting and testing costs and still enjoy the benefits.

The need to maintain that critical eye and stay off the roller coaster will be even more important considering the new tax laws now in effect. Companies no longer get Investment Tax Credits for new equipment purchases. Additionally, depreciation time periods have been lengthened, and corporate taxes have been lowered from 46% to 34%. The net effects will be higher after-tax purchase costs, possibly up to 30% in real terms, and the need for a longer useful life for network equipment. This will make changing technologies more difficult, forcing managers to assess the functional life of new equipment more carefully.

It's easy to get on the new technology roller coaster. However, by using solid business judgment to ensure that a new facility is truly needed from a business standpoint, we can at least make sure the ride is a little safer.

Rappaport is partner-in-charge and Van Wolvelaere is a senior telecommunications manager at Arthur Andersen & Co.'s telecommunications consulting practice in Chicago.

IBM PS/2 FUTURES

BRIAN JEFFERY

Compounds confound

Zounds! IBM is serious about system connectivity. When IBMers started talking about Compound Electronic Documents (CED) a few years back, it sounded rather like science fiction. CEDs are composed of data, text, graphics, image, voice and noncoded information, as well as voice annotation of documents, signature reproduction and video.

Most of the industry discounted CEDs then and, for that matter, it still does. One does not, after all, immediately associate Display-Write 4 or Rolmphones with the office of the future.

IBM has just indicated, however, that CEDs are at the very core of the company's product planning. The Personal System/2 product line, with its overwhelming connectivity, is designed for the creation, editing, transmission, reception, playback and storage of CEDs.

The fact is, IBM has been working on this for years. Back in 1983, the company came out with the now largely forgotten Scanmaster facsimile unit, which was, incidentally, the first new IBM product designed to support LU 6.2.

The Scanmaster had the rather interesting ability to file an image document with a DISOSS data base. If a user was so inclined, he might then call up and view the document on a 327X workstation with appropriate programmed symbol support.

Then, in 1985, IBM unveiled the Personal Computer Voice Communications Option. It sank without a trace, leaving only the memory that it had an Application Program Interface, was Document Interchange Architecture/Document Content Architecture-compatible and allowed voice documents to be filed on a System/36 or System/38.

IBM is not, however, a company to be deterred by minor glitches. There was much dealing behind closed doors, and a variety of products started to appear, including scanners that were part of the 327X line that could file their images on assorted IBM data base management systems.

Suddenly, scanner images were receiving support everywhere, in LU 6.2, by Graphical Display Data Manager, Professional Office System and Personal Services. When IBM started supporting them on the System/36 — which it did, entirely unnoticed, last year — it was clear that something was up.

Meanwhile, IBM was draining the market of optical storage engineers and carting them off to its Tucson, Ariz., facility to work on a supersecret drive project. It was curious that IBM should have been treating the whole business like this. Compact disc — read-only memory (CD-ROM), Write Once Read Many optical disks and the like were easy enough to get; why should IBM have been running Tucson's equivalent of the Manhattan Project when the disciples of CD-ROM would ship the things by the ton if you so much as gave them a purchase order number?

While all of this was going on, Distributed Function Terminal mode was spreading through the IBM product line like religion during an earthquake. Soon, there were remarkably few things that

Jeffery is managing director of International Technology Group, a Palo Alto, Calif.-based research and consulting firm specializing in the IBM market.

When it comes to communications management, the best strategy is a matter of opinion. Pen yours for *Network World's* opinions section. Manuscripts must be letter quality, double spaced and approximately 600 to 750 words in length. Disk and modem submissions are preferred. Columns should be timely, controversial, literate and technically accurate.

Contact Steve Moore, features editor, *Network World*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701, or call (617) 879-0700, ext. 584.

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PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.

1 My primary areas of activity. (Circle ONE only)
I am involved in evaluating communications (data, voice and/or image) products and services:
1. for *use within my own* company/organization
2. for *resale* to other companies/organizations
3. Both
4. Other (explain) ______________________

1a For communications, my primary responsibility is: (Circle ONE only)
1. Data Communications
2. Voice Communications
3. Both
4. Other (explain) ______________________

2 Circle only the ONE title classification which most applies to you.

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CEO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

Data Communications

21. Management
VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff:
Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications

31. Management
VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks, Engineering, Design, R&D, Application Development
32. Supervisory/Staff: Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications

41. Management
42. Supervisory/Staff

MIS/Data Processing

51. Management
VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of Systems Design, Analysis Applications

Others

75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other ______________________

3 Job Function
Which one of the following best describes your functional involvement with communications (data, voice, and /or video) products? (Circle ONE only)

Corporate

1. Business Management, Planning and/or Development

Communications System/Network

2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other ______________________

4 Which one of the following best describes the primary business activity of your organization at this location? (Circle ONE only)

Consultants

11. DP/Communications Consulting Services
12. Consulting Services (except DP/ Communications)

End Users

13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/ Construction/ Petroleum Refining/ Agriculture/ Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, International Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other ______________________

5 In which ways do you typically become involved in acquiring communication products (data, voice, and/or video) and services? (Circle ALL that apply)
1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

6 Check ALL that apply in columns A and B.
A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:
B. These products and services are presently in use at this location:

	A	B	Product/Services
Computers			
01.	☐	☐	Micros
02.	☐	☐	Minis
03.	☐	☐	Mainframes
34.	☐	☐	Printers
Data Communications			
04.	☐	☐	Communications Processors
05.	☐	☐	Comm./Networks Software
06.	☐	☐	Digital Switching Equipment
07.	☐	☐	Facsimile
08.	☐	☐	Modems
09.	☐	☐	Multiplexers
10.	☐	☐	Protocol Converters
11.	☐	☐	Network Mgmt. & Control
12.	☐	☐	Test Equipment
13.	☐	☐	3270 Controllers
35.	☐	☐	Intelligent Terminals
Telecommunications			
14.	☐	☐	PBXs
15.	☐	☐	Key Systems
16.	☐	☐	Central Office Equipment
17.	☐	☐	Integrated Voice/Data Terminals

	A	B	Product/Services
Transmission/Network Services Equipment			
18.	☐	☐	Microwave
19.	☐	☐	Satellite Earth Stations
20.	☐	☐	Local Area Networks
21.	☐	☐	Wide Area Networks
22.	☐	☐	Packet Switching Equipment
23.	☐	☐	Fiber Optic Equipment
36.	☐	☐	T1
Communications Services			
24.	☐	☐	Packet Switching Services
25.	☐	☐	Cellular Mobile Radio Services
26.	☐	☐	Electronic Mail
27.	☐	☐	Enhanced Services
28.	☐	☐	Centrex
29.	☐	☐	Long Haul Services
30.	☐	☐	BOC Services
31.	☐	☐	Independent Telco Services
Other			
32.	☐	☐	Factory Communications
33.	☐	☐	Online Data Bases

7 Estimated value of communications systems, equipment and services:
A. which you helped specify, recommend or approve in *last* 12 months? (Check only ONE in column A.)
B. which you plan to specify,recommend or approve in *next* 12 months? (Check only ONE in column B.)

	A	B	
1.	☐	☐	$10 million and over
2.	☐	☐	$5 million - $9.9 million
3.	☐	☐	$1 million - $4.9 million
4.	☐	☐	$500,000 - $999,999
5.	☐	☐	$250,000 - $499,999
6.	☐	☐	$100,000 - $249,999
7.	☐	☐	$50,000 - $99,999
8.	☐	☐	Under $50,000
9.	☐	☐	Don't Know

8 Estimated gross annual revenues for your entire company/institution: (Circle ONE only)
1. Over $1 billion
2. $500 million to $1 billion
3. $100 million to $499.9 million
4. $50 million to $99.9 million
5. $10 million to $49.9 million
6. $5 million to $9.9 million
7. under $5 million

9 Estimated number of total employees at this location: (Circle ONE only)
1. Over 5,000
2. 1,000 - 4,999
3. 500 - 999
4. 250 - 499
5. 100 - 249
6. 50 - 99
7. 20 - 49
8. 1 - 19

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STOP. Did you do the following:

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THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

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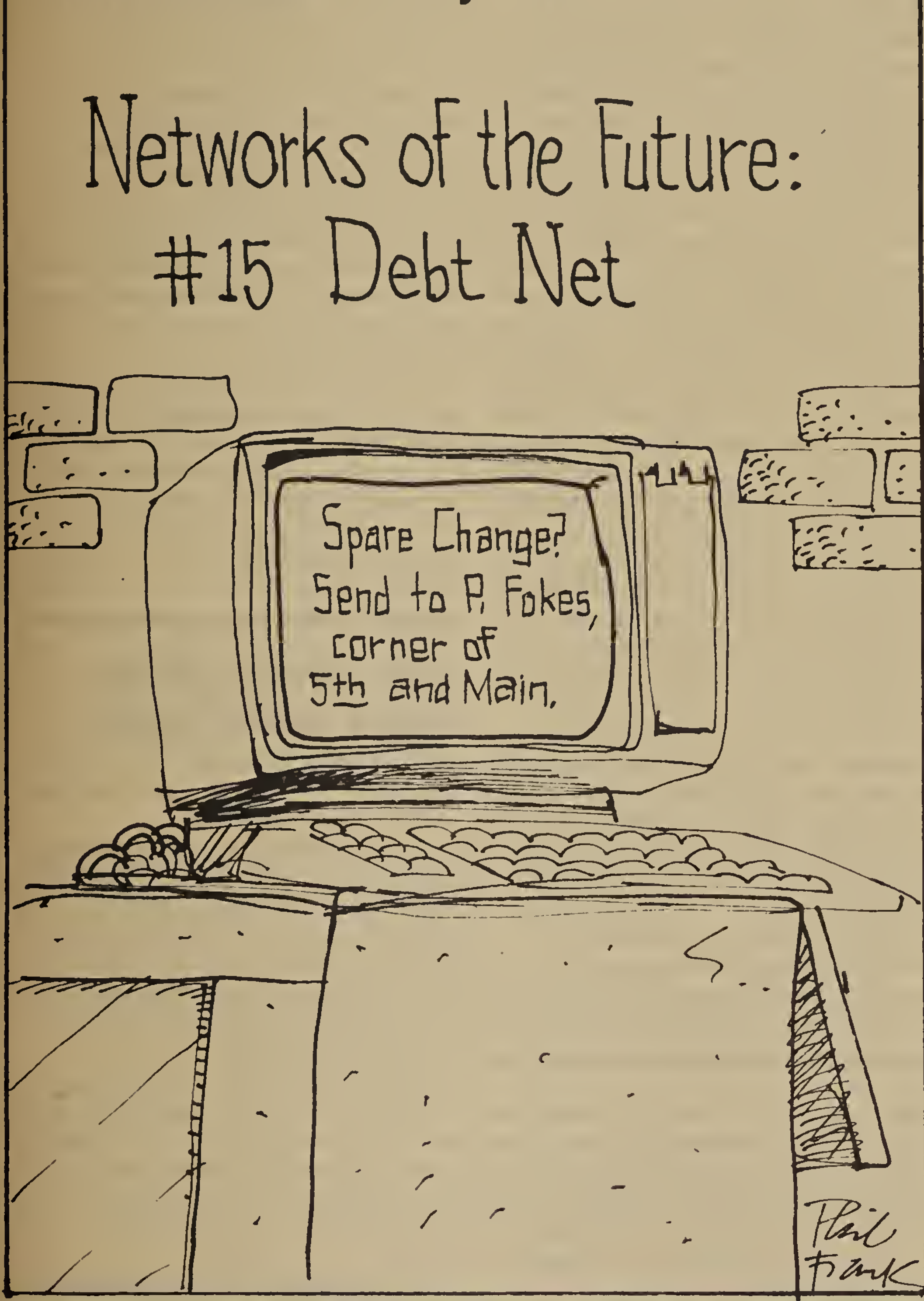
Opinions

▶ TELETOONS — By Phil Frank


Networks of the Future:
#15 Debt Net
Spare Change? Send to P. Fokes, corner of 5th and Main.
Phil Frank

couldn't, with the right microcode, support multiple host LU 6.2 sessions.

Relational data bases and the means of talking to them started moving up and manifested themselves in such devices as Enhanced Connectivity Facilities, as well as in Structured Query Language/Data System (SQL/DS) on the 9370, Remote Relational Access Support and finally in the Operating System/2 Extended Edition.

This was not exactly coincidental. CEDs require pulling together different types of information from different places within a Systems Network Architecture network. And having multiple host sessions appear in multiple screen windows can be useful when putting such a document together.

Once created, CEDs have to be filed somewhere. Information Management System wasn't the obvious candidate; Data Base 2 (DB2) and SQL/DS looked better. IBM started promoting them circa 1983.

At this point, one may ask why IBM should be going to all this trouble for a futuristic office capability for which nobody has been clamoring. The answer to that question is one of the easier pieces in the IBM puzzle.

Imagine a 3090 with DB2 handling CEDs. Such documents, according to IBM's own figures, would incorporate text of up to 4,000 characters per page, graphics at up to 100,000 characters per page, images at 50 to 100,000 characters per page and voice annotation at 104,000 characters for a 13-sec annotation.

Add the fact that these documents are done with up to four host sessions running per workstation. Assume networks of thousands of workstations creating and receiving these documents. Imagine what that means in terms of millions of host instructions per second (MIPS), direct access storage device and software overhead. IBM would be running triple shifts just to get mainframes out the door fast enough to meet demand.

Proponents of the Personal Computer Revolution are also invited to ponder how much of the CPU resources on an 80386-based system would be eaten up creating and playing back CEDs.

This, alas, is the way IBM product designers think. This author has vivid memories of choking on a

See **Compounds** page 42

MANAGEMENT MANEUVERS

ROBERT A. VEGA

How to survive deregulation

"Are you ready for 1984?" When that question appeared on buttons given out at a telecommunications convention late in 1983, many communications managers thought they were. Since then, however, managers have come to realize that they're still not ready for the advent of divestiture.

Some communications managers are angry and confused, and they're not alone; vendors are also trying to find their way.

AT&T can't get a handle on the computer field, IBM is finding that voice communications isn't an easy business, and MCI Communications Corp. wishes the old Long Lines people didn't have such a clear understanding of competition.

Northern Telecom, Inc. wants to become No. 1 in private branch exchange sales again, but the company isn't sure how much direct sales to give up. For a long, long time, Digital Equipment Corp. has been ignoring the trade papers that say "twisted pair will take you there." Wang Laboratories, Inc. lost a superb position in the office automation market, and buying InteCom, Inc. has not helped them find it again. The list is endless.

The technological milestones and marketing hype of the last few years haven't helped matters. Almost three years ago, there were many focus groups for Integrated Voice/Data Terminals (IVDT) and Integrated Services Digital Networks. It seemed clear at the time that the benefits of these technologies, while not yet explicit, would be soon. Communications managers were proud to be on the leading edge as they installed some of the first IVDTs.

Today they're smarter. Managers realize that their companies don't need tomorrow's technology; they need *today's* technology applied creatively to meet *today's* business goals.

Some analysts maintain that much has improved since the first days of divestiture. I challenge that stand: It's going to get worse, and it may never get better. With the emergence of the regional Bell holding companies as major market forces, the telecommunications industry will continue to be a slugfest, where more interconnect companies and manufacturers get trampled and more small users get stuck with orphan systems.

Further, regulatory issues will be argued until most users have forgotten the points of the arguments. No clear winners will come out of this turmoil.

There is a ray of hope, however, if users can learn to manage the confusion in their favor. They can do this by directing vendors' attention to solving today's problems. Tomorrow's technology is for tomorrow's problems.

The challenge for managers is to help meet the business needs of their corporations. The problem is that while a few managers have the luxury to be in information-intensive environments where communications holds great potential for providing a competitive edge, most are limited to maximizing services while minimizing costs.

The manager's responsibility is to educate and lead. When the communications manager's ideas make good business sense, the importance of communications becomes clear, and the company provides the support managers need.

How can managers accomplish this? First, they should know more about their company's business than any other technical manager at their level. Second, they must constantly educate upper management without any expectation of immediate understanding. Third, they must direct vendors' efforts toward meeting the needs of their companies. Finally, the manager must convince his company to implement the correct solutions.

Clearly, a communications manager cannot do this unless he first understands his company's business needs.

Day by day, the telecommunications landscape is changing, but the manager who keeps his head can lead his company to the point where only a small effort will keep it in front of the competition.

When that's done, the manager, the company and the vendors that best meet the company's needs all win. Nothing is more certain than change. But change brings opportunity, if the communications manager is ready. ☑

Vega is lead planning analyst with Empire Blue Cross Blue Shield in New York.

Private nets best bet

continued from page 1

here last week.

The primary conclusion of the study, based on an analysis of the underlying cost relationships of network alternatives, was that private networks will "continue to be the most efficient services for most corporate networks under several conditions" over the next five years.

The report was conceived by Robert Bennis, former chairman of the ICA's TPPC committee, and prepared by Economics & Technology, Inc., a Boston-based communications research firm, and by Howard Frank, founder of Howard Frank Associates, a Washington, D.C. management consultancy.

Besides Bennis, other key contributors to the report included ICA members Arthur Dean of Digital Equipment Corp., Ray Reamer of IBM, Tom Hogan of Monsanto Corp. and William Pomeroy of General Electric Co.

According to the study, private lines will continue to be the networking alternative of choice "where geographic point-to-point specialization exists; where integration is feasible between intercity and international transmission requirements and other telecommunications activities; and where economies of scale result from the joint deployment of communications systems to serve different telecommunications functions, such as voice and data."

Use of public switched networks, to which carriers are trying to migrate private network users in an effort to mitigate their costs, "cannot improve [the] overall telecommunications efficency" of linking company locations with dedicated facilities, according to the study. "The arguments in favor of abandoning dedicated systems rest on assumptions concerning technological cost trends that are obsolete," the study said.

Although private nets appear to offer the best short-term network alternative, the study said the need for dedicated facilities is not "antithetical to the further development of the public switched networks." Some of the traffic transported on private backbone networks is best delivered to its final destination by public switched services, the study said.

Further, the reports' authors admit that the underlying planning model of the study may be made obsolete by deployment of new switched services, principally Integrated Services Digital Network. ISDN may not, however, be available in the five-year time frame examined in the report, the authors said.

The study is presented in three parts, according to Bennis. The first part examines the hows and whys of strategic network planning. The second part is a description and discussion of the strategic planning model used to develop the study's conclusions, which is available to ICA members as a software product compatible with personal computers. The third part is a manual for the planning model.

Bennis said the ICA notified 600 of its member companies of the availability of the planning software, which is available free to users who contact the group's corporate headquarters in Dallas. The study is intended to help ICA members, the nation's largest communications users, formulate their own five-year strategic network plans.

While that planning process must evolve out of a company's internal needs and business environment, the study said, it must also take into account external developments. "More than ever before, external events beyond the direct control of the telecommunications manager or the corporate user will affect the viability and economic efficiency of telecommunications choices."

Four primary external factors capable of influencing network costs and strategic planning are identified and examined, including: technology, regulatory policy, competition and local exchange access charges.

Technological competition among carriers, for example, is expected to accelerate the migration to fiber-optic facilities and drive down long-distance costs (see chart on page 1). This reduction will, in turn, increase the economy and efficiency of specialized private-line networks, the study said.

But carriers are trying to encourage users to migrate away from private-line networks. "The concentrated structure of the switched-services market, and the comparative potential for at least some level of competition in dedicated private-line services, naturally motivates the large public carriers to attempt to induce business users to substitute the former arrangements for the latter," the study claimed.

The study concluded that, "Today, numerous reasons exist to question the motives of dominant carriers to induce business users to accept a turnkey, switched-services approach to satisfying their telecommunications requirements."

Opinions

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sandwich once while hearing an IBMer expound the potential uses of mainframes for holography. Yes, holography. Not exactly a response to customer demand, but think of the MIPS required to process holographic representations, not to mention the phenomenal amounts of disk space and transmission bandwidth that would be necessary.

Still, all of these pale in significance compared with the prospect of multimedia CEDs running around the place under Complex Data Streams.

Although the average user probably doesn't see this kind of thing as a pressing requirement or as a major contribution to office productivity, the Personal System/2 is still a nice machine.

The multitasking is something you can't get on older IBM Personal Computers, the windows are attractive, the graphics are a real improvement.

And who could say no to 16M bytes of addressable random-access memory?

Meanwhile, the Personal System/2 comes with all the connectivity one could ever need for CEDs built into the hardware, the software or both. Even if you're not interested in this sort of thing right now, IBM wants you to have this capability. Big Blue has taken care to build in everything you need in hopes of creating a demand. And eventually, like it or not, you'll be using it.

Users group salutes firms

continued from page 4

foreign exchange facilities did not apply to a Centrex service the company offered called ESSX.

"Of course we were not the typical ESSX user, but it was a tariffed and available service," LaFoe said. ESSX is generally used by local governments that have many locations in a small area. LaFoe is now using it to connect New Orleans and a Gulf Coast site some 100 miles away.

When he went to implement the plan using ESSX, LaFoe was faced with several roadblocks. ESSX employed loop start technique, while the AT&T Dimension private branch exchange at his shore site in Venice, La., used ground start technique. A call to a local telecommunications supply company provided an inexpensive trunk card, which solved the problem.

LaFoe also found he had to overcome a dialing incompatibility problem between his Dimension PBX and the ESSX Centrex service. AT&T suggested an expensive solution requiring Feature Group 15 service from the local operating company, but LaFoe came up with a much less costly alternative. He installed an autodialer made by Mitel Corp. between the PBX and the ESSX service, which eliminated the numbering inconsistency.

LaFoe said when he first planned to implement the ESSX system, other users told him that line quality was poor and data error rates were high. Lafoe said he was willing to take a calculated risk in implementing the new scheme because of the possible payback. According to Lafoe, the new plan was 70% cheaper than if he had stayed with the foreign exchange configuration.

Ryan James, another ICA member honored for ingenuity at the conference, said he believes that innovators have to be risk takers.

James, network projects manager for Connecticut-based United Technologies Corp., supplemented an existing AT&T Electronic Tandem Network with virtual network services from both AT&T and US Sprint. The project cut the network's average cost per minute from 38 cents to 25 cents.

James adopted the virtual network strategy because his ETN costs were rising rapidly since his private-line net was serving many out-of-the-way areas.

James approached the problem by tying those sites to the ETN using AT&T's Software-Defined Network (SDN) and US Sprint's Virtual Private Network (VPN) services.

United Technologies has approximately 25 locations linked via VPN and roughly the same number served by SDN. The firm has about 120 locations on the ETN net.

"If you are within 10 miles of a US Sprint POP they bill you at a flat rate of $100," James said. AT&T was used to reach other key locations.

United Technologies realized large savings with a special US Sprint VPN pricing structure for customer locations within 10 miles of US Sprint's points of presence.

Toll fraud trial sets new tone

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tence of 50 years imprisonment and a $1 million fine.

Toll fraud places a heavy financial burden on MCI and other carriers. Neither MCI nor AT&T would divulge what toll fraud costs them, but US Sprint Communications Co. said fraudulent use of access codes lowered its first-quarter 1987 revenue by $19 million.

Brewer was apprehended through a sting operation conducted with the help of TNT, Southwestern Bell Corp. and the U.S. Secret Service. Southwestern Bell monitored Brewer's private telephone as he dialed numbers sequentially in a trial-and-error attempt to ascertain active access numbers. The regional Bell holding company kept a list of the working access codes obtained by Brewer. Secret Service agents then contacted Brewer, posing as buyers of access numbers. For $3,000, Brewer sold them a list of 15 numbers, which matched the list made by the RBHC.

MCI has joined with AT&T, US Sprint and some smaller carriers to form the Communications Fraud Control Association. Rami Abuhamdeh, executive director of the Tysons Corner, Va.-based group, said there have been several convictions for toll fraud to date, but those cases were decided by judges, not juries.

A number of federal and state statutes apply in stolen code cases, depending on how and where the offender defrauds a carrier, Abuhamdeh said. Gaston Sigur, a lawyer for the antifraud association, said the TNT case is significant because jury convictions are more difficult to get than convictions from a judge, and it indicates that Americans have come to recognize telephone fraud as a serious crime.

Abuhamdeh said that as carriers gain equal access to local exchanges, they will phase out code numbers as a way of accessing long-distance circuits and the level of toll fraud will decline.

Spotlight on users at ICA

continued from page 1

sion groups organized to help ICA members cope with the rapidly changing telecommunications industry.

Users shopped for both wisdom and widgets at the show. Gevenie Delsol of Levi Strauss & Co. in San Francisco said the show provided her with the opportunity to meet and swap telecommunications tales with other communications managers. "I came to talk to other users that have already gone through situations that I may soon experience," she said. "I can also talk to most telecommunications product vendors just by walking around on the show floor."

In conjunction with the ICA meet, members of the National Rolm Users Group (NRUG) met and heard for the first time from recently appointed Rolm President Ray AbuZayyad. (See "NRUG hears AbuZayyad," page 2.) Users were told that the Rolm name would not disappear, but no news was given about future product directions.

IBM was represented at the meeting by Ellen Hancock, an IBM vice-president and president of the company's Communication Products Division. Hancock restated IBM's commitment to connectivity and openness while promoting its role as a systems integrator. (See "IBM as integrator," page 1.) "There is a great diversity in vendors, and users are interested in integrated systems," she said. "But customers want to deal with a single vendor. IBM as a general contractor makes a lot of sense."

Although there was speculation that ICA members would vote at the show whether the group would join the Corporation for Open Systems, no decision was reached. According to ICA officials, an announcement regarding COS membership will be made after outgoing President Chester Bellairs, incoming President William M. Coopman Jr. and Executive Director Stephen M. Christie meet with representatives of COS in early June in Washington, D.C.

ICA members did install new officers at a closed meeting on Thursday. Coopman, who is with Deere & Co., was elected ICA president, and William Pomeroy of General Electric Co. was tabbed to be the group's senior vice-president.

Lee Caputi of Manufacturers Hanover Trust Co. was voted in as vice-president of finance, and Phillip Evans of FMC Corp. was elected vice-president of administration. The group also elected two new board members, Harold Becker of Unisys Corp. and Lawrence Gessini of Agway, Inc. The officers will take over their new posts July 1.

Users were both teaching and learning at the many conference sessions covering day-to-day, realistic problems of communications management.

Joseph Whiteaker, vice-president with NCNB Corp. in Charlotte, N.C., presented an elaborate private branch exchange disaster-recovery plan before two standing-room-only audiences of users. But Whiteaker was also at ICA to learn about other issues.

"I am particularly interested in how other users evaluate T-1 equipment and transmission facilities," he said. "We are looking to replace analog private lines in our network with T-1 links."

Ken Conley, telecommunications manager for Monsanto Corp. in St. Louis, was an ideal candidate for Whiteaker's presentation. "I'm not happy with our company's disaster-recovery plan," he said. "I wanted to sit in on sessions that addressed this area."

In addition to disaster recovery, there were sessions on managing private networks, writing proposals and requests for proposal, using personal computers as telecommunications management tools and selecting interexchange carriers.

Wide-area networking technology tutorials covered such areas as virtual networks, packet-switching, small dish antenna satellite services, fiber optics and T-1 technology.

The Big Eight accounting firm of Coopers and Lybrand conducted an informal study of 150 ICA members and found that most are using local networks and T-1 equipment but have no plans for implementing Integrated Services Digital Network technology. (See "T-1, LANs in wide use," page 6.)

Private networks also made news at the ICA show. Telenet Communications Corp. announced three major private networking contracts worth $50 million. (See "Telenet scores with three big net contracts," page 2.)

US Sprint Communications Co. used the conference as a launch pad for its new 800 service, saying it hopes to capture 12% of the lucrative 800 service market by 1991. (See "US Sprint enters 800 service fray," page 1.)

Members of the Society of Telecommunications Consultants (STC) also met here in conjunction with the ICA show to address the changing identity of the communications consultant. STC members debated a controversial proposal to allow consultants to sell software products. (See "STC eases restrictions," page 6.)

In another user-led session, Rosalie Frazier of General Electric Co. explained how she sells telecommunications projects to the company's upper management. One of Frazier's GE peers, Len Dorrian, chaired an open discussion on how to prepare for network consolidation necessitated by corporate mergers.

Users also participated in a session that dealt with retaining top telecommunications staffers after two firms merge or a company sells off one or more divisions.

Frank Schoff of Chicago-based Tribune Co. said he didn't have any specific agenda for the show. "I came here for three days of telecommunications liberal arts education," he said. "This show gives me the opportunity to step back for a few days from the day-to-day operation of our network and speak with other users."

Robert Mhoon of Dallas-based FMC Corp. said he was especially interested in attending sessions that dealt with new technologies, adding, "I was interested in user presentations that dealt with specific communications management issues." Mhoon also said he collected information on products that may soon be used in his company's T-1 communications network.

Telenet scores three contracts

continued from page 2

200 data centers, manufacturing facilities, and sales and service offices in 15 countries in the U.S., Europe, South America, the Far East and Middle East, according to Wayne Davidson, manager of corporate telecommunications at United Technologies. Telenet will integrate now-separate networks used by United Technologies' eight operating divisions, supplying all hardware, software and day-to-day management of the network. United Technologies declined to disclose the value of the contract.

"We chose Telenet because it is the worldwide leader in packet switching," Davidson said. "Telenet is able to support all the types of equipment we have; it takes a decentralized approach to network management and has a worldwide presence."

Telenet will install its TP3/II packet switches at United Technologies locations to handle traffic between regional sites. In the U.S., the switches will be linked via T-1 facilities leased from a variety of carriers. Telenet will also install in each country a larger TP4/II packet switch to handle international traffic. Those switches will be tied together through transmission facilities leased from international carriers.

The entire network will be managed centrally by a TP5/II network controller located in Hartford, where the TP4/II switch will also be housed. The network will support point-to-point data-encryption to protect classified information being transmitted.

In its contract with Sumitomo, the second largest securities trading company in the world, Telenet will provide packet-switching equipment and install a private network linking more than 130 Sumitomo offices around the world. The value of the contract was not released.

Telenet will provide technical support to integrate the private packet network with the Message Handling System (MHS) network Sumitomo currently uses. Telenet will collaborate with Kokusai Denshin Denwa Kaisha Ltd., the Japanese long-distance company supplying Sumitomo with MHS, in the design of an interface between the two communications systems.

Sumitomo is expanding its worldwide communications system, and the new packet-switching system will provide the network backbone, creating a triangular circuit linking New York, London and Tokyo. Installation of the packet network will begin in January 1988 and will be completed in November.

Ethernet role questioned

continued from page 2

chosen for MAP because of its greater immunity to electromagnetic interference (EMI) and radio frequency interference (RFI). It was also chosen for its greater bandwidth, which allows more services to be run on a single cable and because of the greater distances it can cover.

DEC argues that baseband coaxial cabling can be installed in ways to avoid immunity problems. "You can work around noise immunity problems in an installation by keeping the cable away from big motors, arc welders and other equipment," said DEC's Harris.

Harris said the Ethernet distance-limitation problem can be overcome using bridges, which can extend the distance Ethernet can cover up to 13 miles. But using conduit and bridges adds to the cost of the baseband cabling, according to Mike Zak, vice-president of marketing for Concord Communications, Inc., which makes MAP-compatible communications equipment.

The economic advantage of Ethernet will also disappear over time, Zak said. "The best minds in the MAP business are at work taking costs out of those connections."

One of the key factors that led the MAP/TOP users group to specify use of broadband token-passing bus technology was timing and the need for real-time response in process control environments.

Ethernet uses the carrier-sense multiple access with collision detection method, which is probabilistic, whereas the token-passing access method used on broadband MAP networks is deterministic. With token passing, it is possible to calculate accurately the time it takes for a message to reach its destination, while data collisions and retransmissions in the CSMA/CD scheme make that impossible.

This translates into potential operating problems in factory environments, in which Zak said timely message delivery is often critical.

The operator of a drop forge, for example, cannot afford to have a network delay a message from a light-sensing safety mechanism designed to turn off the machine if his arm inadvertently got in the way of the press.

DEC, however, claims that token passing is not 100% deterministic. "Can you really argue that a token bus is 100% deterministic?" Harris said. "Losing a token happens with token passing, and it takes several seconds to recover that token. If you can live with several seconds of lost token, you can certainly live with Ethernet."

IBM as integrator

continued from page 1

was the first time the company revealed plans to work with other systems integrators to secure large commercial contracts.

In the past year, IBM has structured itself to satisfy users' needs for systems integration, according to Dennis B. Sigloh, director of systems integration at IBM's Information Systems Group (ISG). "There will be times when customers' requirements go beyond our product line," he said. "IBM will be responsible for whatever products and services a customer requires."

L. David Passmore, principal at Network Strategies, Inc., a Fairfax, Va., consulting firm, said many large customers are writing requests for proposal that require computer vendors to supply turnkey, networked systems. "Technicians qualified to install large complex networks are hard to find, and many companies would rather have a vendor do that work for them," he said.

IBM has provided systems integration services to government customers through its Federal Systems Division, and to commercial clients through a group within ISG called Information Services. IBM has also been involved with integration efforts through its work with value-added remarketers and commercial systems integrators.

Sigloh said IBM will step up work with these traditional commercial systems integrators, which include Boeing Computer Services Co. and Electronic Data Systems Corp. The company also plans to work more closely with telecommunications companies such as the regional Bell holding companies, consultants such as the Big Eight accounting firms, and software companies and equipment manufacturers for industrial bids.

Buried amidst IBM's announcements last week was a new release of the company's Transaction Processing Facility (TPF), a VTAM-like communications software system used in host-based networks by large banks, airlines and hotels. The new release partially solves an existing problem stemming from use of different types of Format Identification (FID) formats, which are required to route data through a Systems Network Architecture network.

TPF and older releases of VTAM support 16-bit FID units, dubbed FID1s. Recent releases of IBM's VTAM use 48-bit formats called FID4s. The new format enables customers to increase the number of hosts on an SNA network from 64 to 255, and the number of logical units from 64,000 to 2 million, a capability called Extended Network Addressing (ENA).

Large TPF customers such as American Express Co. and First Interstate Services Co. wanted to mix TPF and ENA nodes on their networks, but were unable to do so because TPF worked only with FID1s and ENA required FID4s.

The latest release of TPF, Version 2 Release 3, provides a degree of relief for such customers. The new TPF software connects to an SNA node working with FID4 formats. However, an FID4 message has to be passed from a TPF network to an ENA network through an SNA Network Interconnect gateway, which translates it to the appropriate format. A TPF network cannot directly support FID4 messaging and is still limited to the pre-ENA constraint of 64,000 logical units.

The new TPF release is priced from $3,075 to $54,140.

IBM also used the press briefing to define how two of its key mainframe software products would fit into the company's recently announced Systems Application Architecture. SAA is meant to simplify the creation of applications that can run on all of IBM's major hardware products.

IBM said last week it had defined a common interface to its Structured Query Language (SQL) in an IBM document entitled "Systems Application Architecture: An Overview." The documented SQL interface should enable software vendors and users to develop applications that will run on a variety of IBM processors. The latest version of SQL includes elements to make IBM's implementation resemble American National Standard Institute SQL standards more closely.

IBM also announced a new release of DB2, its mainframe relational data base program, which incorporates the documented version of SQL. ◻

STC eases restrictions

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was taken on the classification.

Irwin "Wally" Wallace, past president of STC and president of Wallace Communications Consultants of Tampa, Fla., is typical of STC members who believe consultants should only offer their services for sale. "Consultants consult," Wallace said. "They should not sell products."

Dan Stusser, president of the Ergotec Group in Morristown, N.J., takes a different view. Stusser, while he was pleased with the board's decision to expand STC's membership criteria to allow the sale of software developed by consultants, said he believes the bylaws should be further loosened. Stusser said he believes STC should allow its members to process call detail reports for clients, an activity the bylaws currently prohibit. Stusser also said he believes the STC should allow its members to act as brokers for clients in the acquisition of used telecommunications equipment.

George Hancock, a principal of Hancock & Hannon, Inc., a Bellevue, Wash.-based communications consultancy, said he has reservations about STC members selling software, but he acknowledges that many members are eager to be able to provide software.

"We've got a lot of people who have come up with a little thing for sale," Hancock said. "The question is: Where do you draw the line?" ◻

LU 6.2 lacks monitor tools

continued from page 1

Boyle, whose company is hoping to use LU 6.2 applications to link remote offices to the company's host processors. Performance monitoring tools measure such things as terminal response time and supply statistical information that allows a network manager to optimize a network.

In an IBM Systems Network Architecture network, such tools measure 3270 terminal response time. But those measurements cannot be applied to LU 6.2 applications, which have different characteristics. To provide information on LU 6.2 applications, vendors, including IBM, will have to redesign current monitoring tools, users said.

An IBM spokesman acknowledged that LU 6.2 performance monitoring tools are an important customer requirement and said the company is working to provide them.

Performance issues could present a significant challenge to network designers as LU 6.2 applications make their way from test to production environments. "Companies have fine-tuned their networks for 3270 terminal applications," Boyle said. "Corporations will have to rethink and reevaluate network performance issues with new LU 6.2 applications."

A major difference between LU 6.2 and traditional data streams is that, in an LU 6.2 environment, either communicating device can control a session. In a traditional SNA setup, terminals had to wait for a host to respond to a request. Whenever a host was overloaded, attached terminals would sit and wait. With an LU 6.2 application, a device may continue to transmit, even though its peer may be overloaded. The transmitting device may then begin to monopolize the network, and other users' response times will slow to a crawl.

Similar network bottleneck problems emerged a few years ago when personal computers burst onto the scene. Many employees transformed their microcomputers into 3270 terminals with emulation boards and began transferring large files to and from host processors. Because SNA networks are designed to accommodate terminals that communicate on a screen-by-screen basis, microcomputers used to transfer files can bog down networks.

Similar network balancing problems may arise from use of LU 6.2 because LU 6.2 data streams are dynamically allocated. Two applications could be transmitting 2K bytes of data and then dynamically agree to transmit 16K bytes of data. If the network bogs down, network operators have no way of knowing what upset the network traffic flow.

The simplest way to prevent such problems is to overconfigure the network and leave plenty of extra bandwidth, according to Thomas W. McDonald, founding partner at MGT Technology Group, a capacity management consulting firm in Natick, Mass.

One LU 6.2 pioneer, American Family Mutual Insurance Co. in Madison, Wis., followed that path in developing an LU 6.2 application that links IBM Personal Computers and System/36s at branch offices to the company's Amdahl Corp. host. The LU 6.2 applications were given separate communications lines so they would not adversely affect other applications ("Future is now for LU 6.2 user," *NW*, March 30).

Byrne Chapman, manager of technical support at American Family Mutual, said the company has been pleasantly surprised by the performance of the LU 6.2 applications. American Family Mutual relies on an Emcom Corp. performance monitor to capture line-utilization information and store it on the host. The tool has helped the company meet its goals of keeping 95% of the terminal responses under five seconds and 75% of the responses under 2½ seconds.

The company has been so successful that it may soon start mixing LU 6.2 and 3270 data streams on the same lines, even though the Emcom tool cannot differentiate between 3270 and LU 6.2 data streams. "The ability to differentiate between the two types of applications is an enhancement we would like to see Emcom make."

Chapman said LU 6.2 supplies network control functions that 3270 protocols lack. "If there is a problem with a transaction at the host, the LU 6.2 protocols will keep the mainframe and the second device informed of the transaction's status," he said. "With 3270 code, there was no easy way for one device to inform the other that there was trouble."

MGT's McDonald noted that data collection tools will be needed as companies implement LU 6.2 applications on distributed systems, such as the IBM System/36. "There are currently no tools to depict byte throughput, cycle use and buffer use on a System/36 LU 6.2 network," he said.

The current dearth of performance monitoring tools does not come as a surprise to users or analysts. McDonald noted that vendors typically develop communications protocols first and design tools to manage and control the new type of network later.

Boyle said there is a golden market opportunity for the first company to deliver such tools. "Most companies are concentrating on telling users what LU 6.2 is, and we've killed that horse at least 100 times," he said. "If a company wants to make some money, it should develop a course to tell users how to design LU 6.2 applications and deal with LU 6.2 network performance issues." ◻

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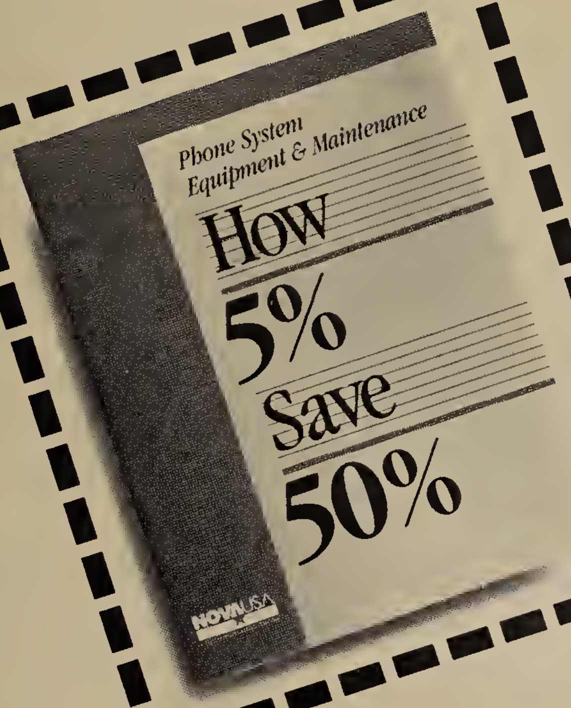

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US Sprint enters 800 fray

continued from page 1

US Sprint President Charles M. Skibo said the company hoped to claim 12% of the 800 service market by 1991, which he estimated would total $7.1 billion.

The service is scheduled to be available nationwide beginning Sept. 1.

US Sprint's 800 entry follows on the heels of MCI's service, which was introduced in September 1986. Western Union Corp. is the only other major carrier offering 800 service.

Skibo claimed, however, that AT&T enjoyed the 1986 $4.5 billion 800 service market to itself.

US Sprint's 800 service will be provided over the company's fiber-optic network, which Skibo said will carry 90% of US Sprint's traffic by the end of the year.

Skibo said the carrier will offer T-1 access to the service for users whose 800 expenses exceed $12,000 a month and dedicated line access for customers with bills under $12,000 a month. Skibo declined to give pricing information but said the carrier will maintain a "price advantage" over competitive offerings.

US Sprint will initially offer 800 service with uniform call distribution, dialed number identification and route advancing. Other features will be rolled out over an 18-month period after the service is cut over.

Uniform call distribution automatically distributes calls evenly among 800 service operator centers, as used in telemarketing campaigns and in large reservation centers. Dialed number identification enables customer operators to identify the 800 number dialed so a single service center can support multiple 800 numbers and determine what incoming calls are in reference to.

Also scheduled for September availability is route advance, which will route 800 calls into customer locations using dial-up lines when dedicated and T-1 circuits are busy. This feature should enable customers to lease T-1 and dedicated access facilities to meet average traffic loads, instead of having to configure for sporadic peak busy hours. US Sprint's initial 800 offerings will also permit intrastate calling on the same line.

Bob Self, president of the New York-based Market Dynamics consulting firm, said, "As US Sprint adds more enhancements over the next 18 months, its 800 services will be highly competitive with those of MCI and AT&T."

Self said US Sprint has priced the services aggressively and customers with over 200 hours of usage a month will find it much cheaper than competitive services. However, Self said the services are not particularly competitive at the low end.

Although the service is supposed to be available in September, Skibo said Common Channel Signaling System 7 (CCS7) will not be fully implemented on the fiber network until at least December.

The CCS7 method will provide greater network intelligence and enable US Sprint to offer more advanced 800 features. AT&T's 800 service currently uses CCS6, an older signaling method but still more advanced than the in-band signaling method US Sprint and other carriers use. AT&T also has a head start over US Sprint in the implementation of CCS7, which will enable the development of still more advanced 800 services.

"The knock on US Sprint will be that it hasn't yet implemented CCS7," said Joaquin Gonzalez, vice-president with Stamford, Conn.-based Gartner Group, Inc. "Until the company has implemented that, you can expect some rockiness with the interim technology."

Skibo disagreed, saying, "I don't think the customer will notice any difference" during the transition period. He admitted, however, that CCS7 will create a more efficient network capable of routing calls faster than existing technology.

Self expressed optimism over US Sprint's entrance into the 800 market. With a 15% estimated annual growth rate, "800 is the fastest growing segment of the domestic long-distance market. Increasing numbers of businesses are coming to rely heavily on telemarketing, and that's good news for all the providers of 800 services."

Correction: According to contract terms, IBM cannot buy more shares or sell its interest in MCI Communications Corp. for two more years, contrary to the opinion expressed in "Rumors fly about MCI prognosis" (*NW*, May 18).

MCI also said its loss for 1986 was attributable to a one-time write-down in the fourth quarter and was the company's first quarterly loss in eight years.

Network World misstated the titles of two MCI officers in "MCI's Bert Roberts" (*NW*, May 18). Bert Roberts is president and chief operating officer. Orville Wright is acting chief executive officer and vice-chairman. *Network World* regrets the errors.

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CALENDAR

June 1-5, Basel, Switzerland — Fifth International European Fiber-Optic Communications and LANs Exposition. Contact: Information Gatekeepers, Inc., 214 Harvard Ave., Boston, Mass. 02134.

June 2-3, Washington, D.C — Fourth Annual Bypass and Local Exchange Competition. Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

June 2-4, Ann Arbor, Mich. — Real Time Factory Control. Contact: Society of Manufacturing Engineers, Special Programs Division, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

June 3-4, Chicago — Networking IBM PCs. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

June 4-5, Washington, D.C. — DDN Technology Seminar. Contact: BBN Communications Corp., 6th Floor, 8000 Westpark Drive, McLean, Va. 22102.

June 4-5, New York — Managing Your SL-1. Contact: *Business Communications Review*, 950 York Road, Hinsdale, Ill. 60521.

June 8-9, Washington, D.C. — Fiber Optics IV: Winning Marketing Strategies in the New Fiber-Optic Marketplace. Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

June 8-10, Washington, D.C. — National Networks Conference. Contact: National Council for Education on Information Strategies, P.O. Box N, Wayland, Mass. 01778.

June 8-10, Chicago — Hands-On X.25. Contact: DataComm Group, Carnegie Building, 55 Main St., Madison, N.J. 07940.

June 9-12, Washington, D.C. — Effective Skills for Technical Managers. Also, June 23-26, Los Angeles. Contact: Integrated Computer Systems, 5800 Hannum Ave., P.O. Box 3614, Culver City, Calif. 90231.

June 11-12, Monterey, Calif. — Fiber Optics: New Network Technologies, Architectures and Economics. Contact: ElectronicCast Corp., Suite 1215, 2121 S. El Camino Real, San Mateo, Calif. 94403.

June 11-12, Washington, D.C. — Trends in International Communications Services: Competition, New Services and Commercial Outlook. Contact: Telecom Publishing Group, P.O. Box 1455, Alexandria, Va. 22313.

June 18-19, New York — Understanding IBM Systems, Products and SNA. Contact: TeleStrategies, Inc., 1355 Beverly Road, McLean, Va. 22101.

PRODUCT REVIEW

LU 6.2 applications finally out

CSI, Orion and Rabbit wares offer similar services, lack in same areas.

BY JOHN J. HUNTER
Contributing Writer

Until recently, commercially available application software that supports LU 6.2 has been as scarce as hen's teeth. That's changing, however, as vendors stop crowing about new products and start releasing them.

Within the last 18 months, a large number of vendors have announced software that will run as LU 6.2/PU 2.1 applications. Three good candidates are Communications Solutions, Inc.'s (CSI) Access/SNA, Orion Group, Inc.'s SNA62 and Rabbit Software Corp.'s Peer-to-Peer Plus. All offer similar services, and all are lacking in the same areas.

The advantage of using LU 6.2 to support PU 2.1 is that devices can communicate and exchange information directly, as opposed to using IBM's more conventional hierarchical procedures, such as the interaction between an IBM host computer and a 3270.

With the proliferation of personal computers and the local processing power they afford, users are less dependent on large mainframes for number crunching and data base management.

However, to pass data between personal computers under Systems Network Architecture, communications are required to go through the host.

In addition, a 3270 cluster controller or similar unit is also needed for the personal computer to talk to the host. LU 6.2 obviates the need for 3270 controllers and hosts in the communications path by distributing network management to each unit supporting that protocol.

LU 6.2 contenders

CSI's, Rabbit's and Orion's LU 6.2 software runs on personal computers under a variety of operating systems, including Unix and MS-DOS. All three are written in C language, which makes them transportable between these operating systems. C language allows bit manipulation and maintains structured programming for easy program maintenance. It also has a programmatic interface to allow it to be called from other applications.

The Orion product uses 300K bytes of random-access memory for its LU 6.2 applications code; the Rabbit and CSI units require 256K and 350K bytes, respectively. All three products provide menus for easy operation and have help commands.

The LU 6.2 protocol also allows communications between IBM and other hosts. Big Blue currently allows LU 6.2/PU 2.1 peer-to-peer connectivity with its System/36 and System/38, Personal Computer XT, AT and RT, Series/1, Model 5520 Office System, Displaywriter, Scanmaster and Model 3280 Page Printer. IBM supports LU 6.2/PU 5.0 terminal-to-host communications with the System/370, 30XX and 43XX.

The CSI, Orion and Rabbit software products closely follow IBM LU 6.2/PU 2.1 conventions for peer-to-peer communications.

Other computer vendors offering LU 6.2/PU 2.1 are Convergent Technologies, Inc., Data General Corp., Unisys Corp. (Sperry Corp. equipment) and Wang Laboratories, Inc.

Those supporting LU 6.2/PU 5.0 are Digital Equipment Corp., Honeywell, Inc., Unisys (Burroughs Corp. equipment) and Tandem Computers, Inc.

Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.

Three popular peer-to-peer packages compared

	Vendor/Product		
	Rabbit Software Corp. Malvern, Pa./ Peer-to-Peer Plus	Orion Group, Inc. Berkeley, Calif./ SNA62	Communications Solutions, Inc. San Jose, Calif./ Access/SNA
APPC, MS/DOS and Unix support	✓	✓	✓
LU 2.1 support	✓	✓	✓
Synchronous point services			
Price per node	Not available	$150	$200

SOURCE: TMS CORP., DEVON, PA.

LU 6.2 operates with many of IBM's network facilities, the acronyms of which read like a permuted alphabet: Advanced Program-to-Program Communications (APPC), DISOSS, SNA Distribution Services (SNADS), Document Interchange Architecture (DIA) and Distributed Data Management (DDM).

DISOSS handles the functions of storing, retrieving and distributing documents. It contains a schema describing the document's structure in a manner prescribed by IBM's Document Content Architecture. This standardization of data representation lets users transmit a document created on one IBM machine to another.

SNADS is a store-and-forward facility that supports DIA and DISOSS. SNADS stores documents and distributes them through DISOSS, and DISOSS can send documents to DIA through SNADS.

DDM manages the retrieval of documents stored on multiple processors and implements the standard record access normally used by programmers, as well as most of the record I/O capabilities of VSAM. All of these network facilities run under APPC.

The key connectivity element is APPC. It establishes sessions, sends and receives data, and terminates sessions. Many users think of APPC as a link-level protocol, but that is not the case. Communications are handled by Synchronous Data Link Control, X.25 and the IEEE 802.5 token-ring local-area network protocol. In all cases, data is transferred in packets. APPC allows communications with custom LU 6.2 applications and host-based applications such as DISOSS.

LU 6.2 is implemented at the PU 2.0 and PU 2.1 device levels. PU 2.0 is used in conventional hierarchical master/slave networks, and LU 6.2 supports sessions with mainframe hosts running MVS and CICS. PU 2.1, which supports peer-to-peer communications, multiplexes multiple concurrent sessions per logical unit. By contrast, PU 2.0 supports only one link and one session per logical unit.

User interface

Users interface with each vendor's LU 6.2 at the application level. They use the LU 6.2 standard Conversation Verb Interface and the Control Operator Verb Interface to call LU 6.2, establish sessions and send and receive data. Typical verbs are: allocate, confirm, deallocate, request to send, send data, and receive and wait. IBM supports LU 6.2/PU 2.1 with RPG III, COBOL and Assembler languages.

The Orion, CSI and Rabbit products support up to 255 concurrently active logical units with up to 510 concurrent sessions (one in each direction) per active link.

A logical unit can initiate and maintain a session not currently in use by a transaction program, and when that program requests a session, the logical unit allocates it.

When finished, the session is placed in a pool for future allocation to other logical units. Sessions are allocated in response to requests, eliminating the need to initiate and terminate sessions each time a program needs one. That, in turn, reduces the overhead required for interprocessor communications.

All three products also allow a logical unit to support different service modes, but they require the transaction program to identify the desired mode when a session is requested. Associating modes and sessions has the benefit of letting the same logical unit support both low-speed and high-speed communications. Also, users can have several simultaneous parallel sessions with another logical unit or a single session with several logical units.

Logical unit sessions are generally between logical unit partners, where one requests a session and the other responds. The logical unit, however, need not reside on the same network and doesn't even have to be a different logical unit. This is useful where server programs are involved.

In addition to the standard LU 6.2 facilities, all three products support a number of node-level facilities that greatly enhance communications. These include multidrop line support, multiple concurrent active physical links and dial-in or dial-out for switched connections. All the systems also provide a peripheral node operator verb interface and log error and status messages.

Common shortcomings

All of the products come up short in two areas. First, they don't support the Cryptographic Verb, the lack of which greatly diminishes data transmission security. Second, the synchronous point service facility used by CICS to ensure data base consistency is missing. Synchronous point services ensure that all data base updates have been posted, or in case of a hardware or software failure, they roll back the data base to its state before the failure occurred. According to the vendors, all of the missing functions are currently being developed.

All three companies are marketing their LU 6.2 application software principally to OEMs. CSI and Orion have installations in the field. Orion's SNA62 is available with the AT&T Model 3B2 computer and soon will be offered with the Philips Information Systems, Inc. P9000. Orion plans to announce a version for Apple Computer, Inc. personal computers soon.

Unisys acts as an OEM for CSI's mainframes, but CSI has end-user installations with United Airlines, Inc. and American Hospital Supply Corp. Rabbit has no units installed but claims that several OEMs are reviewing its product.

Pricing

None of the vendors would quote a specific price, citing that most of their customers have been large user shops or OEMs. The Orion and CSI prices shown in the chart are the vendors' estimates of what a large system would cost per personal computer node. Rabbit declined to provide prices. ◻

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